Homework2　Report
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Q1

1. total number of deaths caused by earthquakes since 2150 B.C. in each country, shows the top 10

```
In [5]: # question 1—1
        met = Sig_Eqs.groupby('Country')['Deaths'].sum()
        met = met.sort_values(ascending=False)[0:10]
        met

Out[5]: Country
        CHINA          2074900.0
        TURKEY         1074569.0
        IRAN           1011437.0
        SYRIA           439224.0
        ITALY           434863.0
        HAITI           323472.0
        AZERBAIJAN      317219.0
        JAPAN           278138.0
        ARMENIA         191890.0
        PAKISTAN        148783.0
        Name: Deaths, dtype: float64
```

2. total number of earthquakes with magnitude larger than 6.0

```
Out[9]: Year
        -2150.0      1
        -2000.0      1
        -1250.0      1
        -1050.0      1
        -479.0       1
                    ..
         2017.0     32
         2018.0     28
         2019.0     27
         2020.0     15
         2021.0     18
        Name: Mag, Length: 530, dtype: int64
```
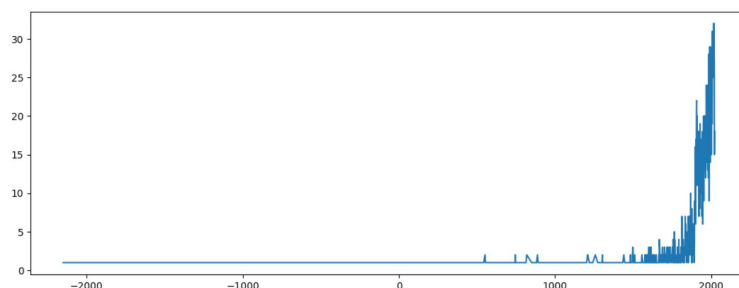

It seem the earthquake is more frequently with the time pass by, but this may not be true since there exists the possibility of lacking of earthquake record in the old centuries.

3.Write a function CountEq_LargestEq that returns both (1) the total number of earthquakes since 2150 B.C. in a given country AND (2) the date of the largest earthquake ever happened in this country.

Out[7]:

	Country	CountEq	LargestEqDate
14	CHINA	610	1668/7/25
32	JAPAN	409	2011/3/11
68	INDONESIA	401	2004/12/26
7	IRAN	380	856/12/22
9	TURKEY	330	1916/1/24
...	...	...	...
93	NORWAY	1	1819/8/31
126	CENTRAL AFRICAN REPUBLIC	1	1921/9/16
124	PALAU	1	1914/10/23
118	KIRIBATI	1	1905/6/30
155	COMOROS	1	2018/5/15

156 rows × 3 columns

Q2　　　Plot monthly averaged wind speed as a function of the observation time.
X tab is year_month
Y tab is wind speed
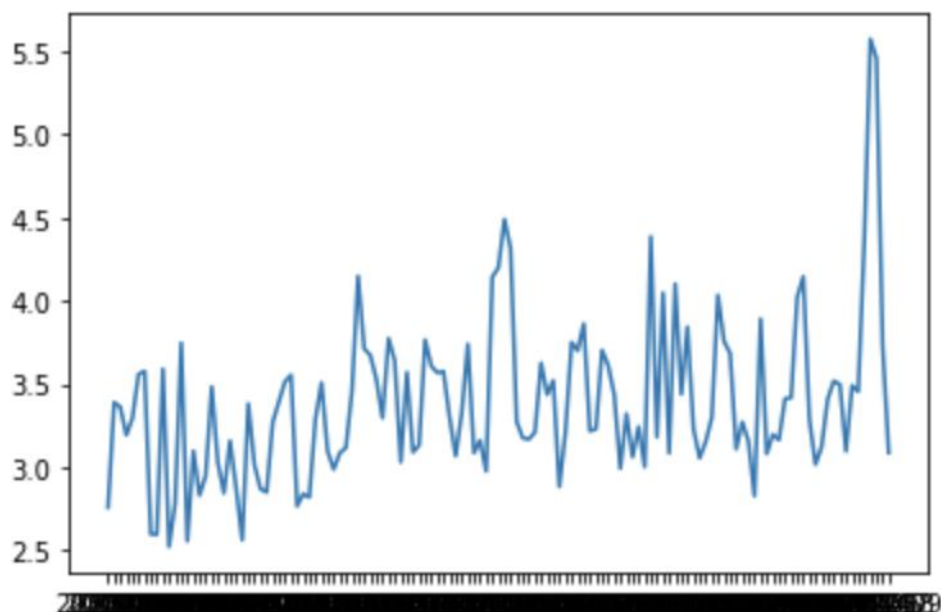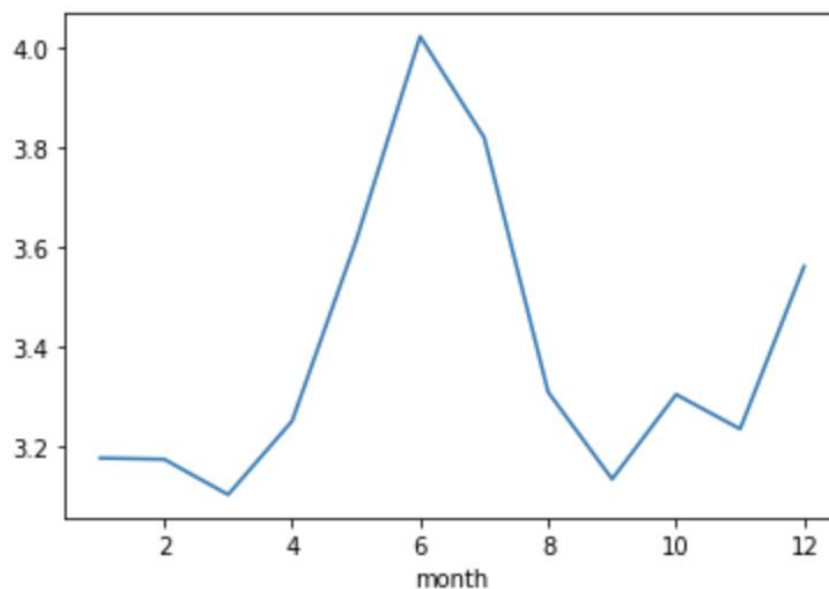
```
MONTH
2010-01    2.756267
2010-02    3.388060
2010-03    3.360700
2010-04    3.191341
2010-05    3.293640
              ...
2020-05    4.362198
2020-06    5.575800
2020-07    5.459140
2020-08    3.733608
2020-09    3.085019
Name: WND_SPD, Length: 129, dtype: float64
```

Decennial monthly average

In monthly averaged wind speed within the past 10 years. wind speeds range is between 2 and 6, many month averaged wind speed is between 2 and 4 , the most averaged wind speed in 2020-7. The wind speeds are highest in June and July. The lowest wind speed is in March and September.

Q3. I use the Global CFC-11 Production Annual Data from Advanced Global Atmospheric Gases Experiment (AGAGE) website

1.

Out[19]:

	Year	A-Production	A-Released	T-Production	T-Released	T-Unreleased
0	1931	NaN	NaN	NaN	NaN	NaN
1	1932	NaN	NaN	NaN	NaN	NaN
2	1933	NaN	NaN	NaN	NaN	NaN
3	1934	NaN	NaN	NaN	NaN	NaN
4	1935	0.0	0.0	0.1	0.0	0.1
...	...	...	...	...	...	...
68	1999	13.1	48.3	8814.4	7867.0	947.4
69	2000	10.0	44.8	8824.4	7911.8	912.6
70	2001	8.4	41.1	8832.9	7952.9	880.0
71	2002	6.9	37.4	8839.8	7990.3	849.5
72	2003	3.2	34.5	8843.0	8024.8	818.2

73 rows × 6 columns

Out[23]:

	Year	A-Production	A-Released	T-Production	T-Released	T-Unreleased
0	1931	0.0	0.0	0.0	0.0	0.0
1	1932	0.0	0.0	0.0	0.0	0.0
2	1933	0.0	0.0	0.0	0.0	0.0
3	1934	0.0	0.0	0.0	0.0	0.0
4	1935	0.0	0.0	0.1	0.0	0.1
...	...	...	...	...	...	...
68	1999	13.1	48.3	8814.4	7867.0	947.4
69	2000	10.0	44.8	8824.4	7911.8	912.6
70	2001	8.4	41.1	8832.9	7952.9	880.0
71	2002	6.9	37.4	8839.8	7990.3	849.5
72	2003	3.2	34.5	8843.0	8024.8	818.2

73 rows × 6 columns

2. Plot of annual CFC-11 Released in 1930-2003
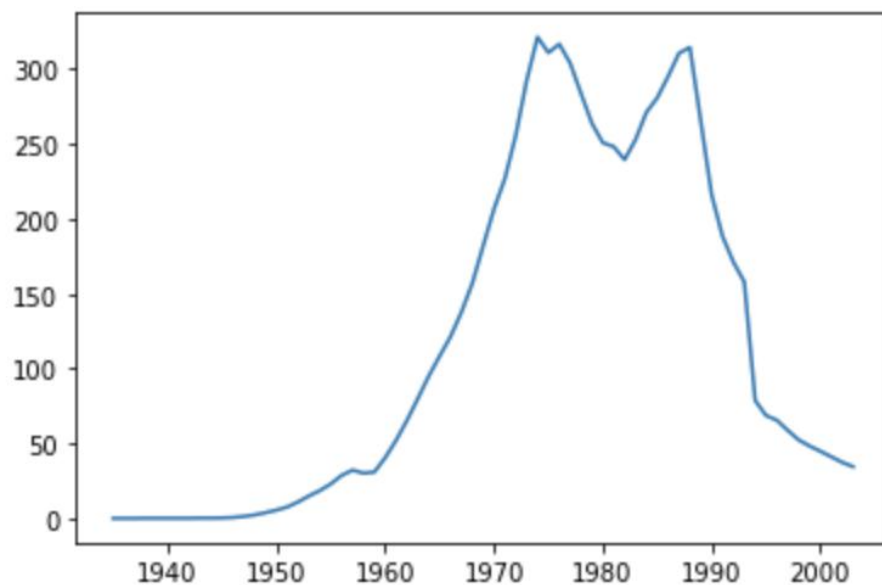
3. I check the max year of CFC-11 Release, the mean CFC-11 Annual Release in 1930-2003,
max year of CFC-11 a-released, the sum CFC-11 Annual Product in 1930-2003 , the years of A-Released >300 and the top 10 years of CFC-11 Annual Product

```
In [25]: #question3_3
         maxrow = met['A-Released'].argmax()
         met.loc[maxrow]

Out[25]: Year           1974.0
         A-Production    375.3
         A-Released      321.4
         T-Production   3025.5
         T-Released     2554.0
         T-Unreleased    471.5
         Name: 43, dtype: float64
```

```
In [29]: met['A-Released'].mean()

Out[29]: 116.30000000000001
```

```
In [32]: met['A-Released'].max()

Out[32]: 321.4
```

```
In [45]: met['T-Released'].sum()

Out[45]: 196767.3
```

```
In [46]: met1 = met.loc[(met['A-Released']>300)]
         met1
```

Out[46]:

	Year	A-Production	A-Released	T-Production	T-Released	T-Unreleased
43	1974	375.3	321.4	3025.5	2554.0	471.5
44	1975	318.8	310.9	3344.3	2864.9	479.4
45	1976	344.9	316.7	3689.2	3181.5	507.7
46	1977	325.3	303.9	4014.5	3485.5	529.0
56	1987	387.8	310.6	7170.6	6181.6	988.9
57	1988	381.6	314.5	7552.2	6496.2	1056.0

```
In [49]: met = met.sort_values(['A-Released'], ascending=[0]).reset_index(drop=True)
         print(met.head(10))
```

```
   Year  A-Production  A-Released  T-Production  T-Released  T-Unreleased
0  1974         375.3       321.4        3025.5      2554.0         471.5
1  1976         344.9       316.7        3689.2      3181.5         507.7
2  1988         381.6       314.5        7552.2      6496.2        1056.0
3  1975         318.8       310.9        3344.3      2864.9         479.4
4  1987         387.8       310.6        7170.6      6181.6         988.9
5  1977         325.3       303.9        4014.5      3485.5         529.0
6  1986         355.4       295.1        6782.8      5871.1         911.7
7  1973         354.3       292.4        2650.2      2232.5         417.7
8  1978         313.5       283.6        4328.0      3769.1         558.9
9  1985         331.7       280.8        6427.4      5576.0         851.4
```