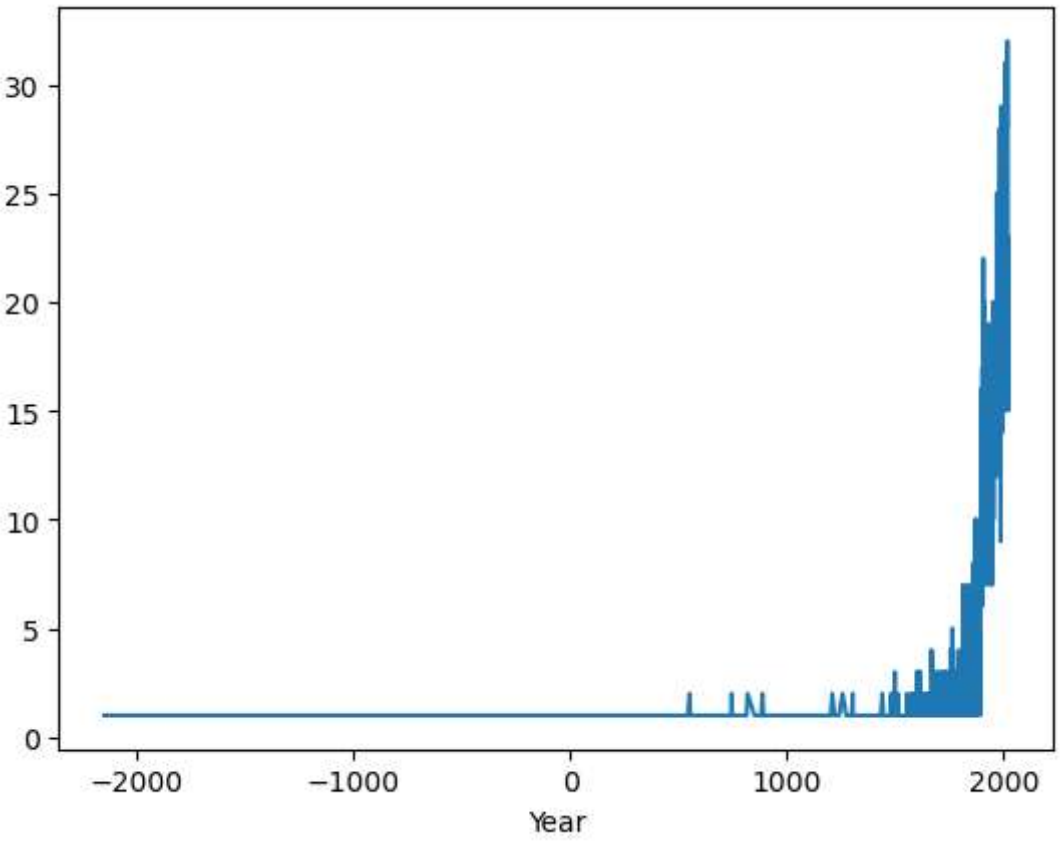
In [94]:
```
import pandas as pd
import numpy as np
from matplotlib import pyplot as plt
%matplotlib inline
import warnings
warnings.filterwarnings("ignore")
import datetime as dt
from datetime import datetime
```

In [95]:
```
#1.1
Sig_Eqs=pd.read_csv("earthquakes-2023-11-05_14-40-09_+0800.tsv",sep="\t")
#aggregate deaths by region
total=Sig_Eqs.groupby(['Country']).sum()['Deaths']
#Descending arrangement
total.sort_values(ascending=False).head(10)
```

Out[95]:
```
Country
CHINA          2075045.0
TURKEY         1188881.0
IRAN           1011449.0
ITALY           498478.0
SYRIA           439224.0
HAITI           323478.0
AZERBAIJAN      317219.0
JAPAN           279085.0
ARMENIA         191890.0
PAKISTAN        145083.0
Name: Deaths, dtype: float64
```

In [96]:
```
#1.2
Sig_Eqs['Number']=1
#The number of mag above 6
total_1=Sig_Eqs.loc[Sig_Eqs['Mag']>6.0].groupby(['Year']).sum()['Number']
total_1.plot.line()
#Earthquakes have been recorded more frequently since 1500. The reason may be the lac
```

Out[96]: <Axes: xlabel='Year'>



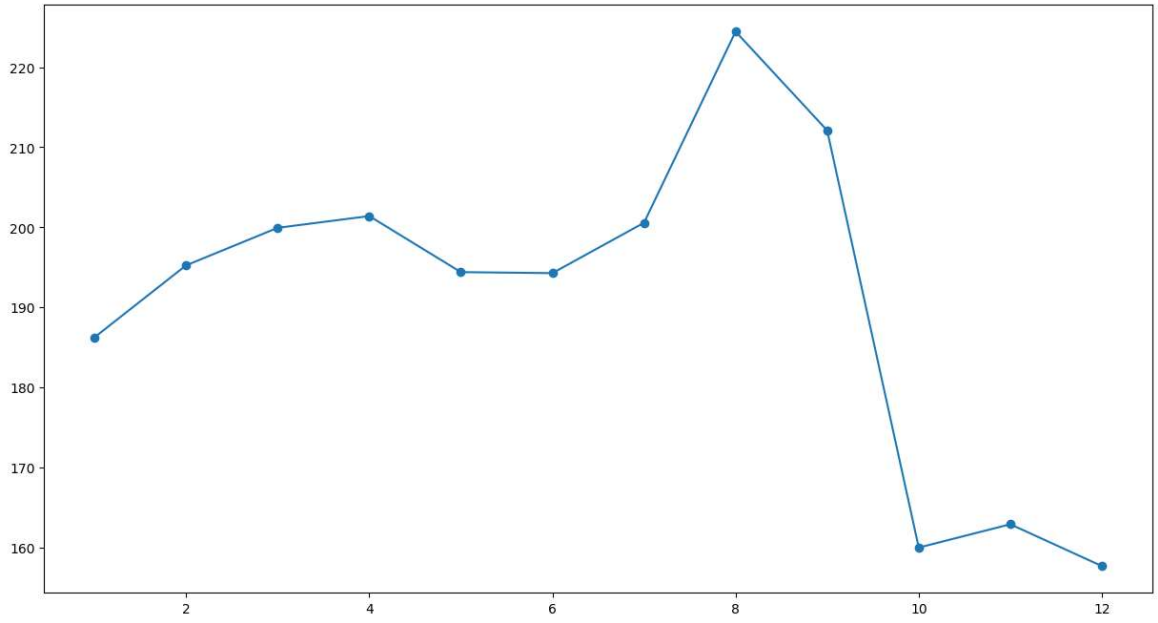
In [97]:
```
#1.3.1
def CountEq_LargestEq(country):
    earthquakes = Sig_Eqs[Sig_Eqs['Country'] == country]
    #The earthquakes are ranked in descending mag order,with the first being the stro
    largest_earthquake = earthquakes.sort_values(by='Mag', ascending=False).iloc[0]
    #the number of earthquakes
    count = len(earthquakes)
    return largest_earthquake['Year'],largest_earthquake['Mo'],largest_earthquake['D
#Take China for example
CountEq_LargestEq("CHINA")
```

Out[97]: (1668.0, 7.0, 25.0)

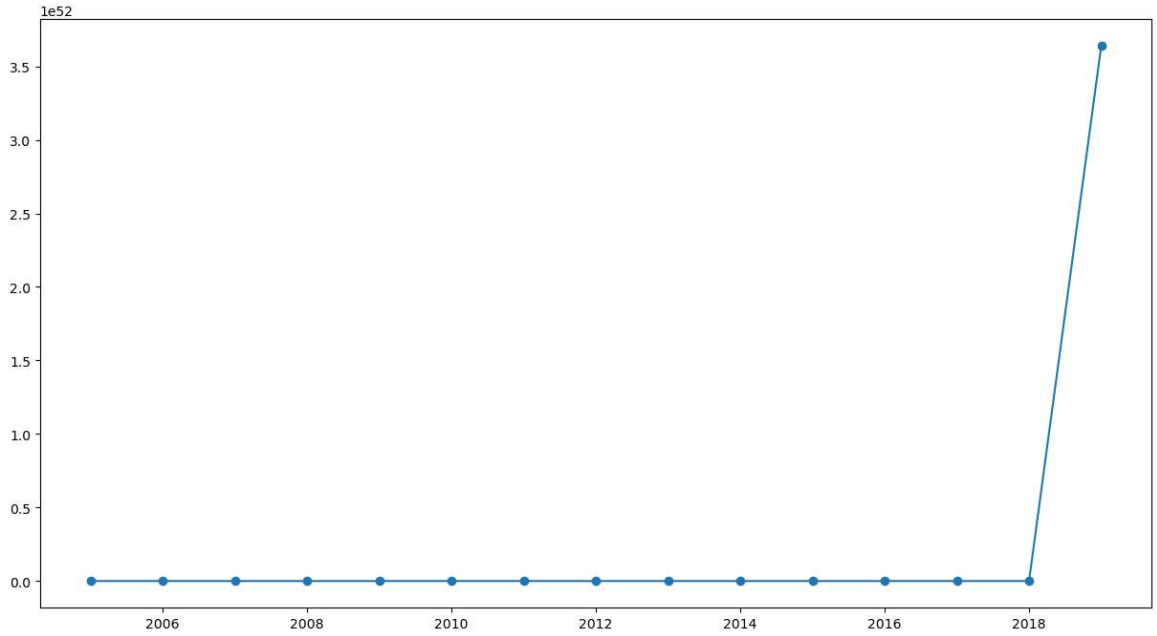
In [98]:
```
#1.3.2
#Eliminate duplicate countries. I learned this line of code from the Internet
unique_countries = list(set(Sig_Eqs['Country']))
#Apply CountEq_LargestEq to every country in the file. I can't do descending here
for i in unique_countries:
    print(i)
    print(CountEq_LargestEq(i))
```

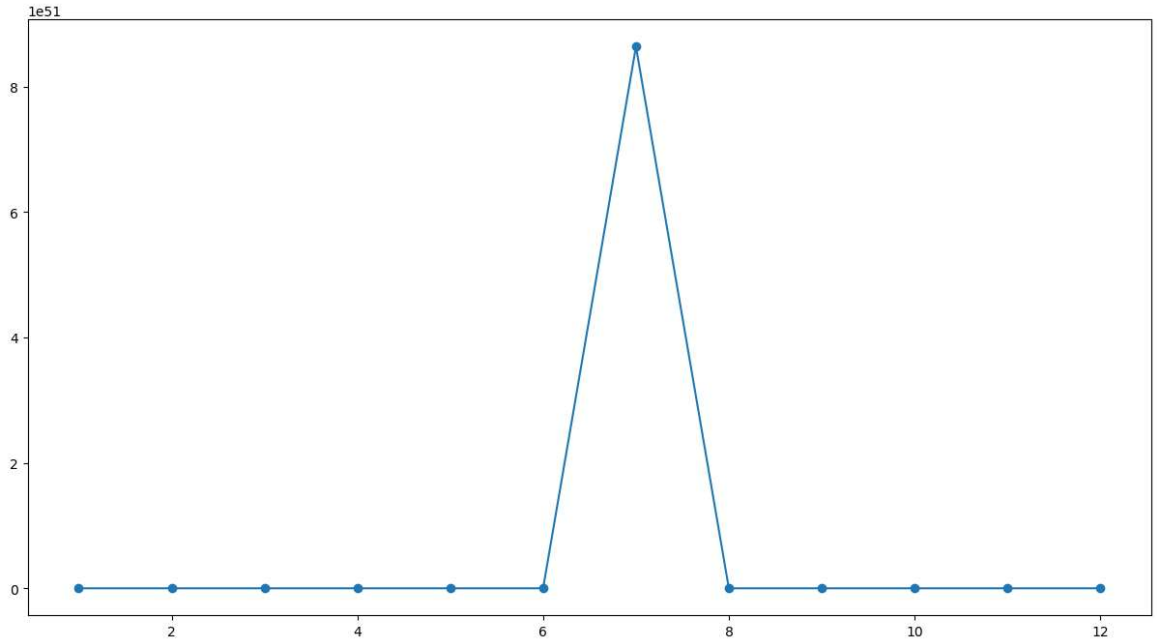
```
AZORES (PORTUGAL)
(1968.0, 2.0, 28.0)
CENTRAL AFRICAN REPUBLIC
(1921.0, 9.0, 16.0)
BURUNDI
(2004.0, 2.0, 24.0)
VENEZUELA
(1894.0, 4.0, 29.0)
SOUTH KOREA
(1700.0, 9.0, 12.0)
GABON
(1974.0, 9.0, 23.0)
LAOS
(2007.0, 5.0, 16.0)
TONGA
(1919.0, 4.0, 30.0)
VANUATU
(1913.0, 10.0, 14.0)
BULGARIA
```

In [99]:
```
#2 This problem was solved by the inquiring Zhao Wangchao
data = pd.read_csv("2281305.csv")
#Null removal
data['WND'] = data['WND'].dropna()
#Separate the values of each part by ","
data['q'], data['w'], data['e'], data['r'], data['t'] = data['WND'].str.split(',').st
#The outlier 9999 is removed
data = data[data['q'] != 9999]
#Converts the date to datetime format
data["DATE"] = pd.to_datetime(data["DATE"], format="%Y-%m-%dT%H:%M:%S")  # Convert da
#Changing the q column value to a floating point number makes it computable
data['q'] = data['q'].astype(float)
#Monthly mean
months = data.groupby(data['DATE'].dt.month)['q'].mean()
plt.figure(figsize=(15,8))
m = range(1,13)
plt.plot(m, months, marker='o')
plt.show()
#The wind speed is higher in summer and lower in autumn and winter
```

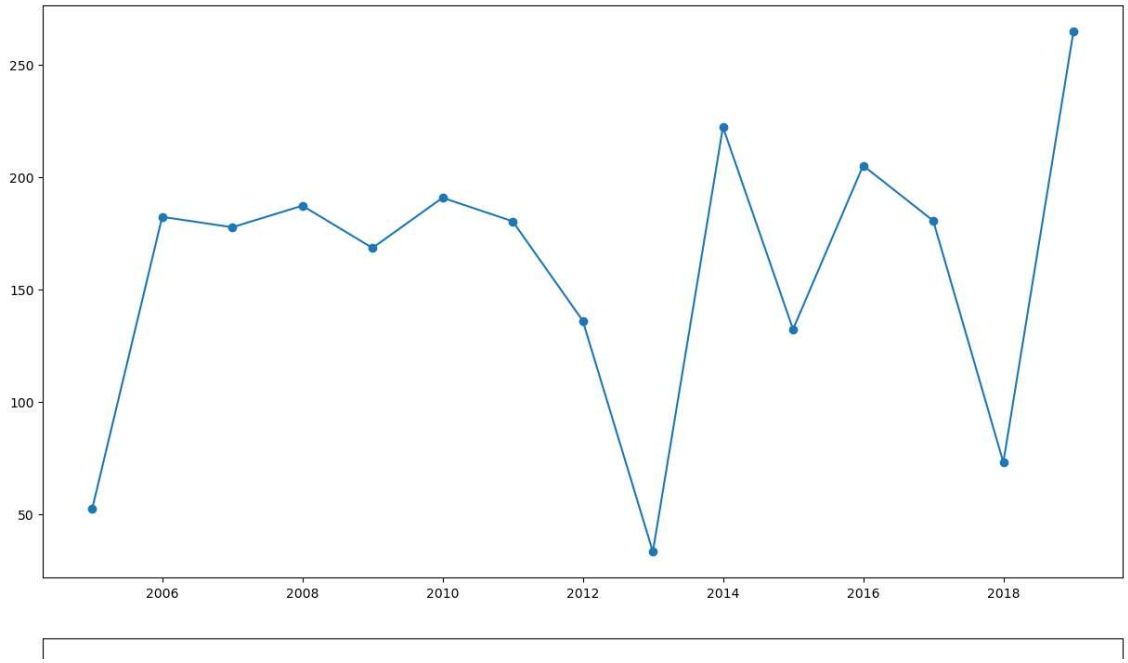


In [100]:
```
#3
data = pd.read_csv("NAMORS_EC_2005-2019.csv")
#Null removal
data = data.dropna()
#Converts the date to datetime format
data["date"] = pd.to_datetime(data["date"], format="%Y-%m-%d")
#Remove untrusted values of
data_h2o = data[data['qc_h2o_flux'] != 1]
#Find the yearly average h2o_flux
year = data_h2o.groupby(data_h2o['date'].dt.year)['h2o_flux'].mean()
plt.figure(figsize=(15, 8))
y = range(2005, 2020)
plt.plot(y, year, marker='o')
plt.show()
#Find the monthly average h2o_flux
months = data_h2o.groupby(data_h2o['date'].dt.month)['h2o_flux'].mean()
plt.figure(figsize=(15,8))
m = range(1,13)
plt.plot(m, months, marker='o')
plt.show()
```





In [101]:
```
#Find the yearly average h2o_molar_density
year1 = data_h2o.groupby(data_h2o['date'].dt.year)['h2o_molar_density'].mean()
plt.figure(figsize=(15, 8))
y = range(2005, 2020)
plt.plot(y, year1, marker='o')
plt.show()
#Find the monthly average h2o_molar_density
months1 = data_h2o.groupby(data_h2o['date'].dt.month)['h2o_molar_density'].mean()
plt.figure(figsize=(15,8))
m = range(1,13)
plt.plot(m, months1, marker='o')
plt.show()
#Find the yearly average water_vapor_density
data_h2o['water_vapor_density'] = data_h2o['water_vapor_density'].astype(float)
year2 = data_h2o.groupby(data_h2o['date'].dt.year)['water_vapor_density'].mean()
plt.figure(figsize=(15, 8))
y = range(2005, 2020)
plt.plot(y, year2, marker='o')
plt.show()
#Find the monthly average water_vapor_density
months2 = data_h2o.groupby(data_h2o['date'].dt.month)['water_vapor_density'].mean()
plt.figure(figsize=(15,8))
m = range(1,13)
plt.plot(m, months2, marker='o')
plt.show()
#h2o_molar_density and water_vapor_density fluctuate greatly with the year but have n
#while they are higher in summer and lower in winter.
```



In [102]:
```
plt.figure(figsize=(15, 8))
plt.plot(year1, year2, marker='o')
plt.show()
plt.figure(figsize=(15,8))
plt.plot(months1, months2, marker='o')
plt.show()
#h2o_molar_density and water_vapor_density have monthly and annual correlations
```