

## 1. Significant earthquakes since 2150 B.C.

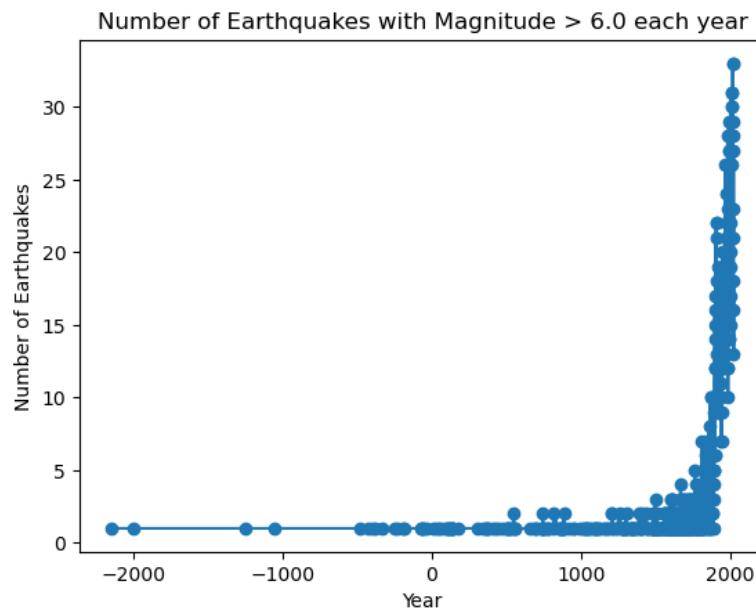
1.1 计算自公元前 2150 年以来各国因地震造成的死亡总人数，然后打印出死亡人数最多的十个国家及其总死亡人数。

结果：

|     | Country    | Deaths    |
|-----|------------|-----------|
| 28  | CHINA      | 2139210.0 |
| 142 | TURKEY     | 1199742.0 |
| 65  | IRAN       | 1014453.0 |
| 69  | ITALY      | 498219.0  |
| 132 | SYRIA      | 419226.0  |
| 58  | HAITI      | 323484.0  |
| 10  | AZERBAIJAN | 319251.0  |
| 71  | JAPAN      | 242445.0  |
| 6   | ARMENIA    | 191890.0  |
| 103 | PAKISTAN   | 145083.0  |

1.2 计算全球每年震级大于 6.0 的地震总数（使用 Mag 列作为震级），然后绘制时间序列图。你观察到任何趋势了吗？解释为什么或为什么不？

结果：



从结果可以看到近几百年地震记录非常多，但是并不能说明地震发生的多，随着技术的进步，尤其是地震仪器的普及和敏感度提高，过去未被记录的地震现在可能被检测到，导致较晚年份的地震数量增加。

1.3 编写一个名为 CountEq\_LargestEq 的函数，该函数返回（1）自公元前 2150 年以来给定国家发生的地震总数，以及（2）该国历史上最大地震的发生日期。将此函数应用于文件中的每个国家，并按降序报告结果。

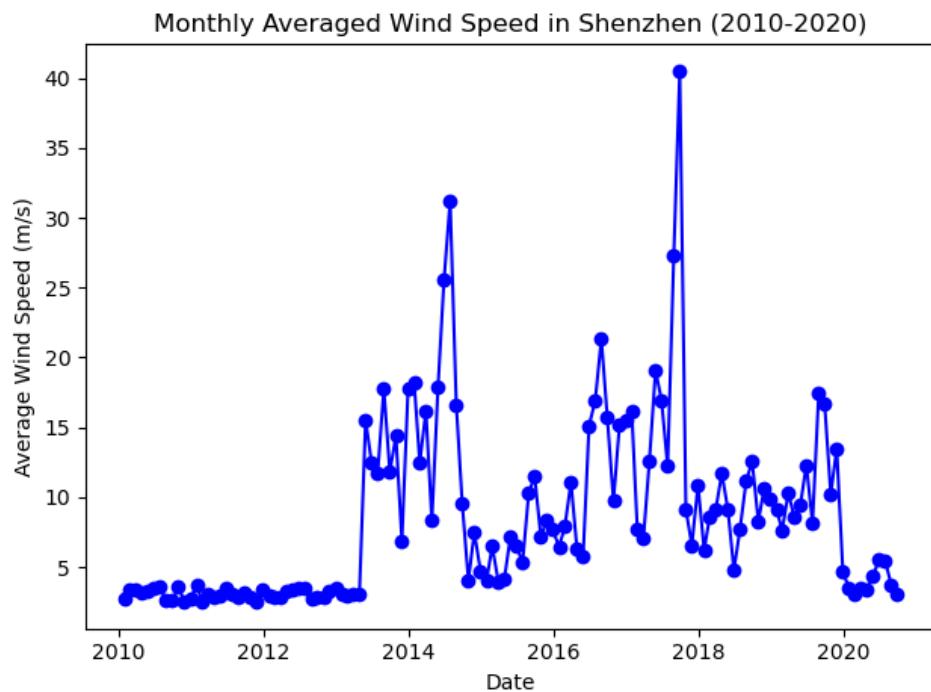
结果：

| Country                                      | Earthquakes | Year   | Largest Mag |
|--|-------------|--------|-------------|
| CAMBODIA                                     | 623         | 1660.0 | 8.5         |
| JAPAN  | 424         | 1651.0 | 9.1         |
| INDONESIA                                    | 421         | 2004.0 | 9.1         |
| IRAN   | 381         | 856.0  | 7.9         |
| TURKEY                                       | 358         | 1939.0 | 7.8         |
| ITALY  | 333         | 1915.0 | 7.5         |
| GREECE                                       | 289         | 1900.0 | 8.0         |
| USA  | 280         | 1954.0 | 9.2         |
| PHILIPPINES                                  | 230         | 1897.0 | 8.7         |
| MEXICO                                       | 214         | 1787.0 | 8.6         |
| CHILE  | 200         | 1960.0 | 9.5         |
| PERU   | 194         | 1713.0 | 8.8         |
| ROMANIA                                      | 158         | 1952.0 | 9.0         |
| PAPUA NEW GUINEA                             | 107         | 1919.0 | 8.2         |
| INDIA  | 102         | 1950.0 | 8.6         |
| TAIWAN                                       | 81          | 1920.0 | 8.2         |
| COLOMBIA                                     | 82          | 1824.0 | 8.2         |
| NEW ZEALAND                                  | 72          | 1956.0 | 8.0         |
| ECUADOR                                      | 69          | 1960.0 | 8.8         |
| AFGHANISTAN                                  | 68          | 1909.0 | 8.1         |
| VENEZUELA                                    | 65          | 1530.0 | 8.0         |
| VANUATU                                      | 64          | 1913.0 | 8.1         |
| SIMPSON ISLANDS                              | 63          | 1877.0 | 8.1         |
| ALGERIA                                      | 57          | 1980.0 | 7.1         |
| ALBANIA                                      | 56          | 1893.0 | 7.5         |
| CROATIA                                      | 53          | 1667.0 | 7.2         |
| PAKISTAN                                     | 53          | 1945.0 | 8.0         |
| GUATEMALA                                    | 47          | 1974.0 | 7.7         |
| MYANMAR (BURMA)                              | 43          | 1912.0 | 8.0         |
| FRANCE                                       | 43          | 1817.0 | 8.0         |
| EL SALVADOR                                  | 42          | 1776.0 | 7.9         |
| NICARAGUA                                    | 39          | 1894.0 | 7.9         |
| ARMENIA                                      | 39          | 1993.0 | 7.5         |
| USA TERRITORY                                | 38          | 1902.0 | 8.1         |
| COSTA RICA                                   | 37          | 1950.0 | 7.7         |
| SPAIN  | 35          | 881.0  | 7.5         |
| SYRIA  | 33          | 1282.0 | 7.6         |
| SWITZERLAND                                  | 31          | 1111.0 | 6.2         |
| PORTUGAL                                     | 28          | 60.0   | 8.5         |
| TAJIKISTAN                                   | 28          | 1987.0 | 7.4         |
| AZORES (PORTUGAL)                            | 28          | 1968.0 | 7.6         |
| NEW CALEDONIA                                | 28          | 1875.0 | 8.0         |
| AUSTRALIA                                    | 26          | 1980.0 | 8.2         |
| TOKELAU                                      | 25          | 1931.0 | 8.1         |
| IRAQ   | 24          | 1864.0 | 6.4         |
| ISRAEL                                       | 24          | -31.0  | 7.0         |
| PANAMA                                       | 23          | 1882.0 | 8.3         |
| KINGMAN ISLANDS (NEW ZEALAND)                | 23          | 1988.0 | 8.1         |
| SLOVENIA                                     | 22          | 2015.0 | 6.5         |
| SOUTH KOREA                                  | 22          | 1643.0 | 6.5         |
| CANADA                                       | 22          | 1949.0 | 8.1         |
| HOROCO                                       | 21          | 2023.0 | 6.8         |
| HAITI  | 21          | 1842.0 | 8.0         |
| NEPAL  | 21          | 1951.0 | 8.2         |
| FIDI   | 20          | 1919.0 | 8.3         |
| JAMAICA                                      | 19          | 1899.0 | 7.8         |
| DOMINICAN REPUBLIC                           | 19          | 1946.0 | 7.9         |
| BOLIVIA                                      | 19          | 1994.0 | 8.2         |
| BURKINA FASO                                 | 18          | 1980.0 | 7.8         |
| AFGHANISTAN                                  | 17          | 1667.0 | 6.9         |
| BANGLADESH                                   | 17          | 1918.0 | 7.6         |
| ICELAND                                      | 17          | 1912.0 | 7.5         |
| Egypt  | 16          | 1995.0 | 7.2         |
| HONDURAS                                     | 15          | 2025.0 | 7.6         |
| CUBA   | 15          | 2000.0 | 7.7         |
| GEORGIA                                      | 15          | 1985.0 | 7.5         |
| ROMANIA                                      | 15          | 1977.0 | 7.5         |
| SERBIA                                       | 15          | 1922.0 | 6.0         |
| KYRGYZSTAN                                   | 15          | 1911.0 | 8.0         |
| UZBEKISTAN                                   | 14          | 1977.0 | 7.0         |
| LEBANON                                      | 14          | 1759.0 | 7.4         |
| UK   | 14          | 1580.0 | 6.2         |
| SOUTH AFRICA                                 | 14          | 1942.0 | 7.9         |
| NETHERLANDS                                  | 13          | 1979.0 | 6.2         |
| ARMENIA                                      | 13          | 1993.0 | 6.8         |
| BRAZIL                                       | 13          | 1963.0 | 7.6         |
| TURKMENISTAN                                 | 12          | 1895.0 | 8.2         |
| UKRAINE                                      | 12          | 183.0  | 7.0         |
| BOSNIA-HERZEGOVINA                           | 11          | 1969.0 | 6.4         |
| UZBEKISTAN                                   | 10          | 1979.0 | 6.0         |
| MONTENEGRO                                   | 10          | 1579.0 | 6.9         |
| ETHIOPIA                                     | 10          | 1986.0 | 6.5         |
| HARTINIQUE                                   | 10          | 1986.0 | 7.9         |
| GUADALOUPE                                   | 9           | 1843.0 | 8.3         |
| KAZAKHSTAN                                   | 9           | 1973.0 | 8.3         |
| TUNISIA                                      | 9           | 1957.0 | 5.6         |
| GERMANY                                      | 9           | 1978.0 | 5.3         |
| SAO TOME                                     | 8           | 1917.0 | 8.3         |
| CYPRUS                                       | 8           | 1953.0 | 6.3         |
| THAILAND AND TOBAGO                          | 8           | 1893.0 | 7.5         |
| AUSTRIA                                      | 8           | 1590.0 | 6.6         |
| POLAND                                       | 8           | 2004.0 | 4.8         |
| TANZANIA                                     | 8           | 1910.0 | 7.3         |
| ATLANTIC OCEAN                               | 7           | 1941.0 | 7.8         |
| SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS | 7           | 1923.0 | 8.1         |
| CONGO  | 7           | 1991.0 | 7.0         |
| ANTARCTICA                                   | 6           | 1998.0 | 8.1         |
| MONGOLIA                                     | 6           | 1985.0 | 8.4         |
| ERITREA                                      | 6           | 1875.0 | 6.2         |
| VIETNAM                                      | 6           | 1931.0 | 6.8         |
| North Korea                                  | 6           | 1515.0 | 6.7         |
| RUANDA                                       | 5           | 2015.0 | 5.8         |
| JORDAN                                       | 5           | 2150.0 | 7.3         |
| BHUTAN                                       | 5           | 2089.0 | 6.1         |
| GHANA  | 5           | 1861.0 | 6.5         |
| HUNGARY                                      | 5           | 1973.0 | 6.8         |
| UGANDA                                       | 4           | 1912.0 | 6.8         |
| MALAWI                                       | 4           | 1989.0 | 6.1         |
| THAILAND                                     | 4           | 2014.0 | 6.1         |
| HICRONESIA, FED. STATES OF                   | 4           | 1911.0 | 7.7         |
| GUERNSEY                                     | 4           | 1993.0 | 7.1         |
| SAUDI ARABIA                                 | 3           | 2009.0 | 5.7         |
| MOZAMBIQUE                                   | 3           | 2006.0 | 7.0         |
| INDIAN OCEAN                                 | 3           | 1928.0 | 8.1         |
| KRISTIANSAND                                 | 3           | 1928.0 | 6.9         |
| SLOVAKIA                                     | 3           | 2000.0 | 2.2         |
| NETHERLANDS                                  | 3           | 1922.0 | 5.2         |
| MALAYSIA                                     | 3           | 1976.0 | 6.2         |
| ANTIGUA AND BARBUDA                          | 3           | 1650.0 | 8.0         |
| URUGUAY                                      | 2           | 169.0  | NaN         |
| TRINIDAD                                     | 2           | 1783.0 | 5.6         |
| UK TERRITORY                                 | 2           | 1983.0 | 7.6         |
| PACIFIC OCEAN                                | 2           | 1932.0 | 7.5         |
| OMAN   | 2           | 1570.0 | 7.0         |
| CAMEROON                                     | 2           | 1945.0 | 6.2         |
| CAIRNS ISLANDS                               | 2           | 20.0   | NaN         |
| LIBYA  | 2           | 1961.0 | 5.4         |
| LAOS   | 2           | 2007.0 | 6.3         |
| COTE D'IVOIRE                                | 2           | 1879.0 | 5.7         |
| FRENCH GUYANA                                | 2           | 1885.0 | 6.9         |
| SANTO DOMINGO                                | 2           | NaN    | NaN         |
| SOLomon SEA                                  | 2           | 1891.0 | 7.3         |
| BERING SEA                                   | 1           | 1991.0 | 6.7         |
| BARBADOS                                     | 1           | NaN    | NaN         |
| CENTRAL AFRICAN REPUBLIC                     | 1           | 1921.0 | 4.8         |
| BURUNDI                                      | 1           | 2004.0 | 4.7         |
| BURKINA                                      | 1           | 1983.0 | 5.0         |
| BRITISH VIRGIN ISLANDS                       | 1           | NaN    | NaN         |
| COMOROS                                      | 1           | 2018.0 | 5.9         |
| DJIBOUTI                                     | 1           | 1989.0 | 6.3         |
| CZECH REPUBLIC                               | 1           | 2006.0 | 4.1         |
| GUERNSEY                                     | 1           | 168.0  | NaN         |
| MONTSERRAT                                   | 1           | NaN    | NaN         |
| MADAGASCAR                                   | 1           | 2017.0 | 5.5         |
| IRELAND                                      | 1           | NaN    | NaN         |
| KIRIBATI                                     | 1           | 1985.0 | 7.6         |
| FRENCH POLYNESIA                             | 1           | 1941.0 | 6.5         |
| GABON  | 1           | 1974.0 | 6.2         |
| GUINEA                                       | 1           | 1983.0 | 6.2         |
| PALAU  | 1           | 1914.0 | 7.6         |
| SIERRA LEONE                                 | 1           | 1795.0 | 5.2         |
| SAINT VINCENT AND THE GRENADINES             | 1           | 1601.0 | NaN         |
| NORWAY                                       | 1           | 1810.0 | 5.8         |
| SRI LANKA                                    | 1           | NaN    | NaN         |
| TASHAN SEA                                   | 1           | 1892.0 | 6.6         |
| SUDAN  | 1           | 1993.0 | 5.5         |
| WALLIS AND FUTUNA (FRENCH TERRITORY)         | 1           | 1993.0 | 6.4         |
| ZAMBIA                                       | 1           | 2017.0 | 5.9         |

## 2. Wind speed in Shenzhen from 2010 to 2020

绘制月平均风速随时间变化的曲线图。2010 年至 2020 年期间，月平均风速是否存在变化趋势？

结果：



结论：

2010-2020 年的月平均风速整体上没有明显的长期上升或下降趋势，但存在一定的年际波动。2010-2013 年左右风速较低，2013-2015 年间风速较高，最大值接近 35m/s，2016-2020 年间风速出现过几次高峰，最大平均风速超过 40m/s。

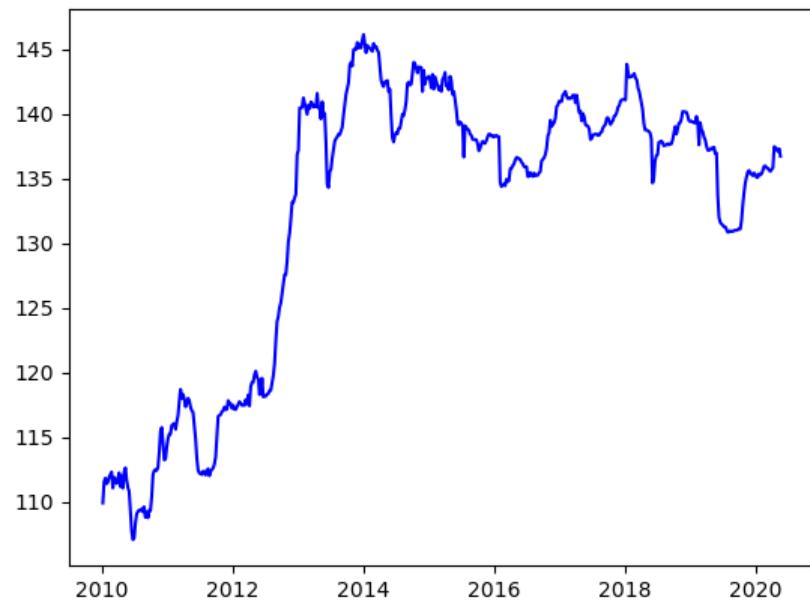
## 3. Explore a data set

该文件从 <https://data.casearth.cn/my/dataset/edit> 下载，题目为“2011-2021 国际农产品价格数据”，文件名为“SDG 基础数据.xlsx”

### 3.1 数据导入及处理

|   | 2008年<br>=100 | 时间         |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------------|
| 0 | 110.24        | 109.89        | 113           | 107.48        | 100.68        | 95.92         | 123.36        | 101.89        | 2010-01-07 |
| 1 | 110.01        | 111.54        | 112.97        | 108.52        | 100.51        | 96.19         | 125.82        | 96.51         | 2010-01-14 |
| 2 | 111.76        | 111.81        | 114.36        | 108.9         | 102.01        | 96.41         | 125.86        | 100.23        | 2010-01-21 |
| 3 | 111.9         | 111.38        | 114.15        | 109.82        | 102.8         | 96.39         | 127.88        | 101.01        | 2010-01-28 |
| 4 | 112.07        | 111.51        | 114.1         | 110.27        | 103.71        | 96.22         | 128.78        | 99.43         | 2010-02-04 |

### 3.2 绘制“小麦”价格指数的时间序列图



### 3.3 小麦价格统计分析

均值: 132.34377759961905

中位数: 137.45

标准差: 11.091580473775991

最小值: 107.05

最大值: 146.13

结论:

从 2010 到 2020，小麦价格在 2013 年间增长较大，在 2014 至 2020 年间一直保持着上下波动，价格较为稳定。

其中最小值 107.05，最大值 146.13，表明在期间内，小麦价格指数的波动幅度大约在 39 单位之间。

整体来看，小麦价格指数的均值接近 130，表示小麦的收购价格相对较为稳定，相对于 2008 年（基准 100）来说，整体价格上升。