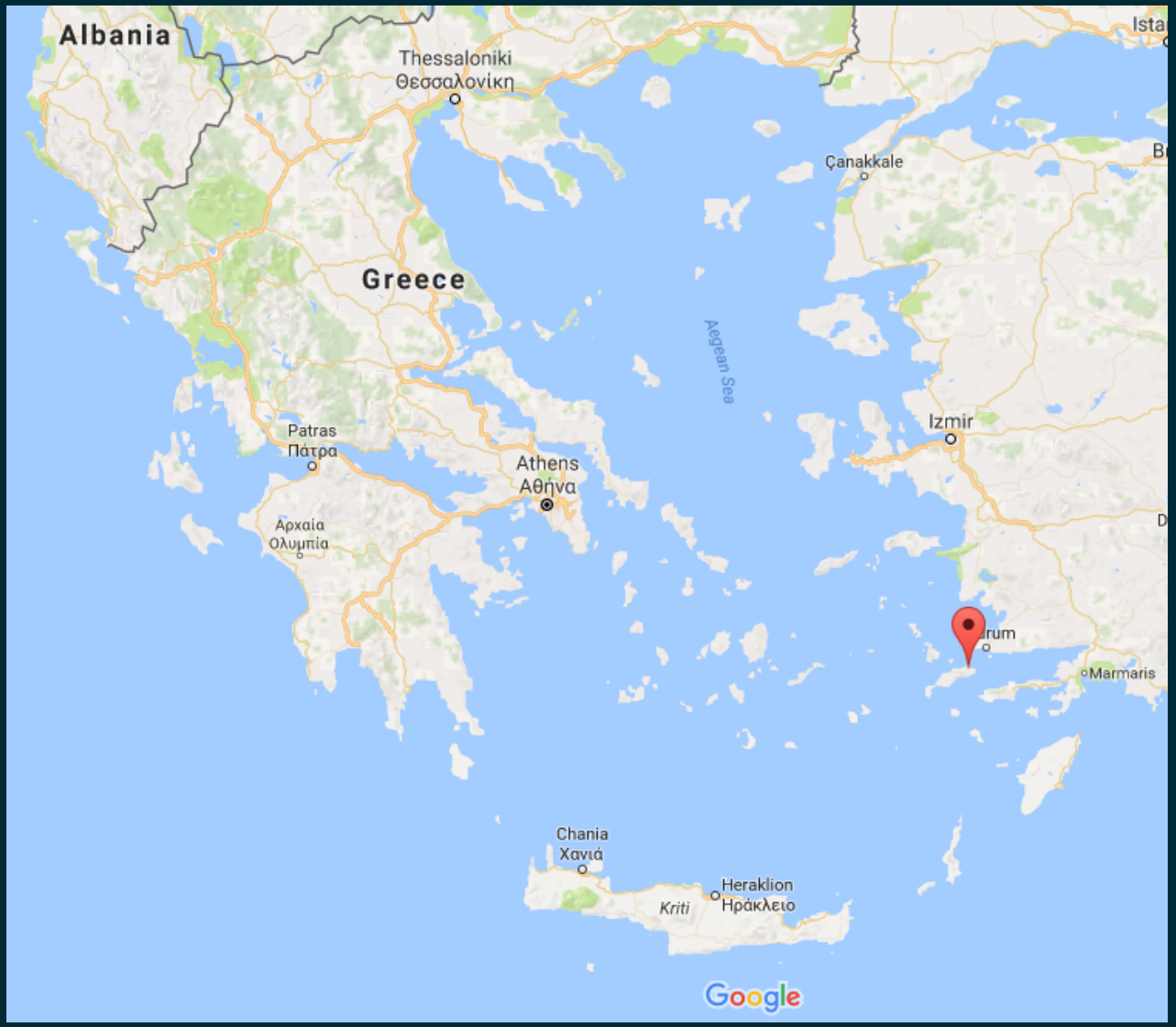
A trip to earth science with Python as a companion

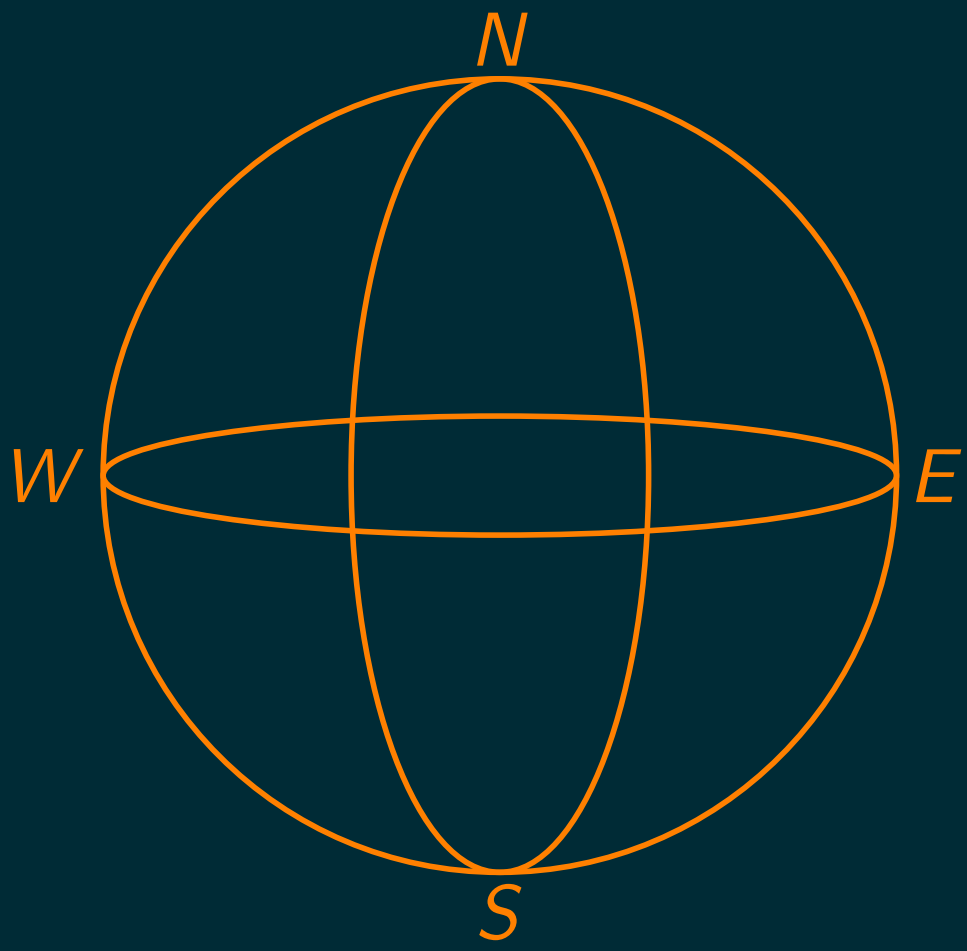
@NikoletaGlyn

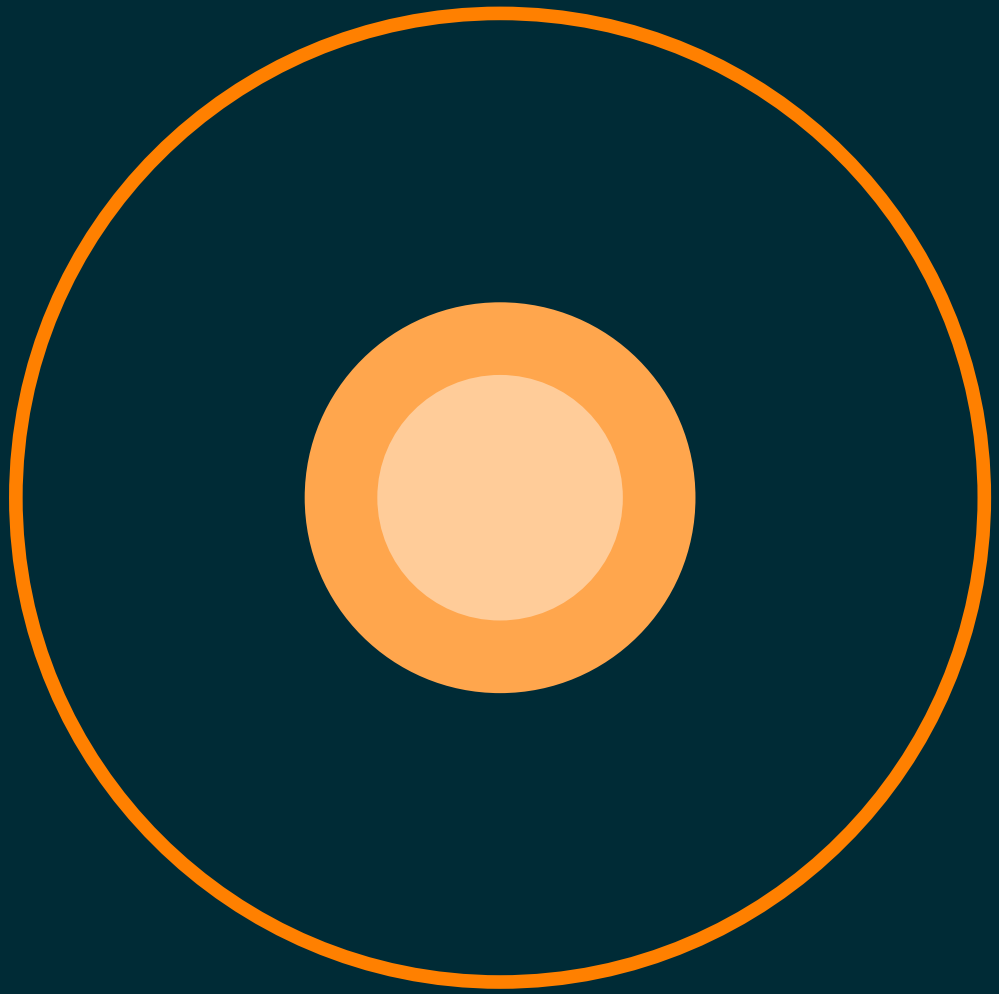
HINTS:

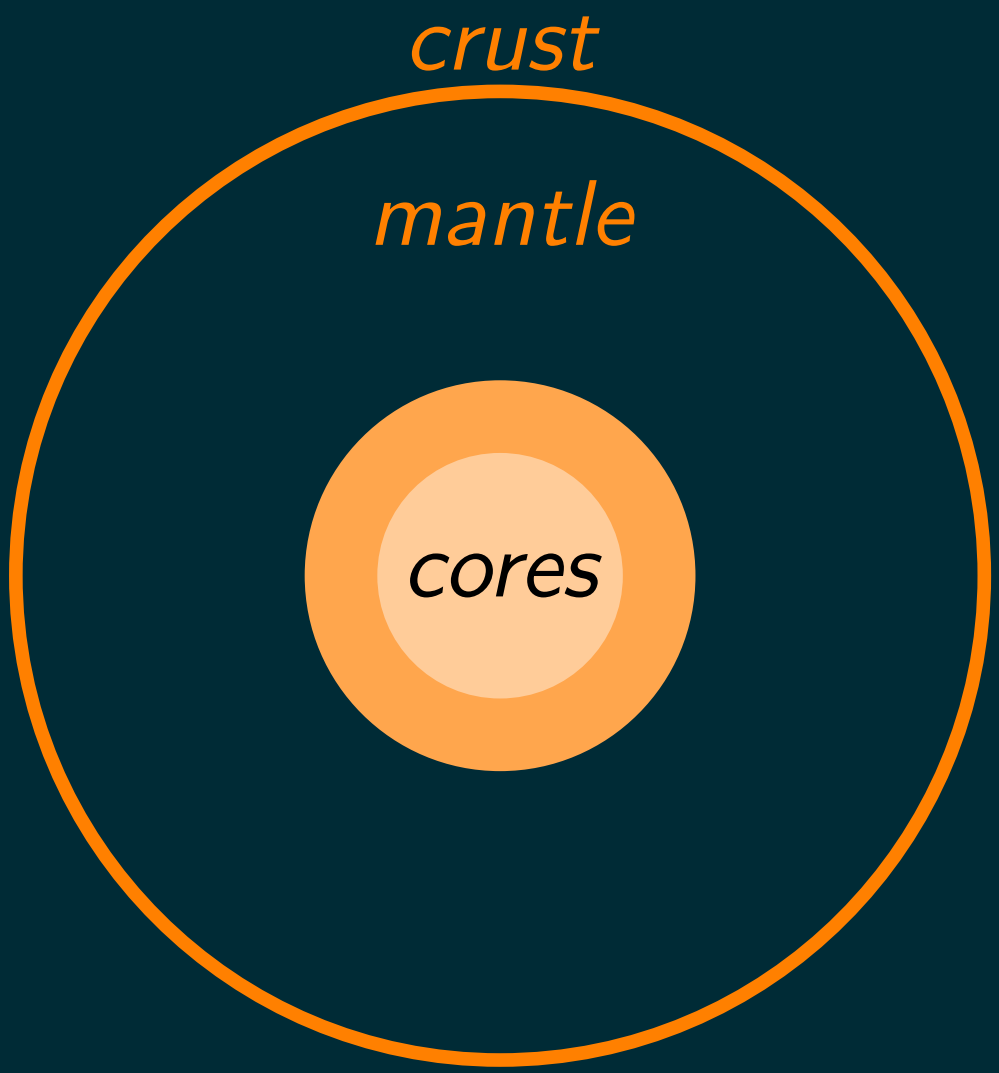
HINTS:

- ☑ several things have been invented by my ancestors;
- ☑ mathematics make use of my alphabet;


Albania
Thessaloniki
Θεσσαλονίκη
Çanakkale
Greece
Aegean Sea
Izmir
Patras
Πάτρα
Athens
Αθήνα
Αρχαία
Ολυμπία
Marmaris
Chania
Χανιά
Heraklion
Ηράκλειο
Kriti
Google

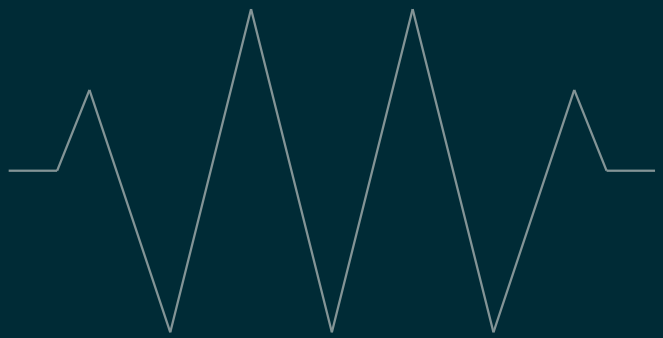

N
W
E
S




crust
mantle
cores

```
>>> import quakefeeds
>>> from quakefeeds import QuakeFeed

>>> feed = QuakeFeed("2.5", "month")
>>> feed.title
'USGS Magnitude 2.5+ Earthquakes, Past Month'
```

MAGNITUDE



Class	Magnitude
Great	8 or more
Major	7 - 7.9
Strong	6 - 6.9
Moderate	5 - 5.9
Light	4 - 4.9
Minor	3 -3.9

```
{'geometry': {'coordinates': [27.3346, 36.9405, 5.01], 'type': 'Point'},
 'id': 'us1000apsm',
 'properties': {'alert': None,
  'cdi': 4.1,
  'code': '1000apsm',
  'detail': 'https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/us1000apsm.geojson',
  'dmin': 0.962,
  'felt': 59,
  'gap': 45,
  'ids': ',us1000apsm,',
  'mag': 4.4,
  'magType': 'mb',
  'mmi': None,
  'net': 'us',
  'nst': None,
  'place': '6km NE of Kos, Greece',
  'rms': 0.82,
  'sig': 322,
  'sources': ',us,',
  'status': 'reviewed',
  'time': 1507665564350,
  'title': 'M 4.4 - 6km NE of Kos, Greece',
  'tsunami': 0,
  'type': 'earthquake',
  'types': ',dyfi,geoserve,origin,phase-data,',
  'tz': 120,
  'updated': 1508097562926,
  'url': 'https://earthquake.usgs.gov/earthquakes/eventpage/us1000apsm'},
 'type': 'Feature'}
```

```
>>> import earthquakes
>>> from earthquakes import earthquakes

>>> report = earthquakes.get_report()
>>> report['title']
'USGS Significant Earthquakes, Past Hour'
>>> report = earthquakes.get_report('week', '4.5')
```

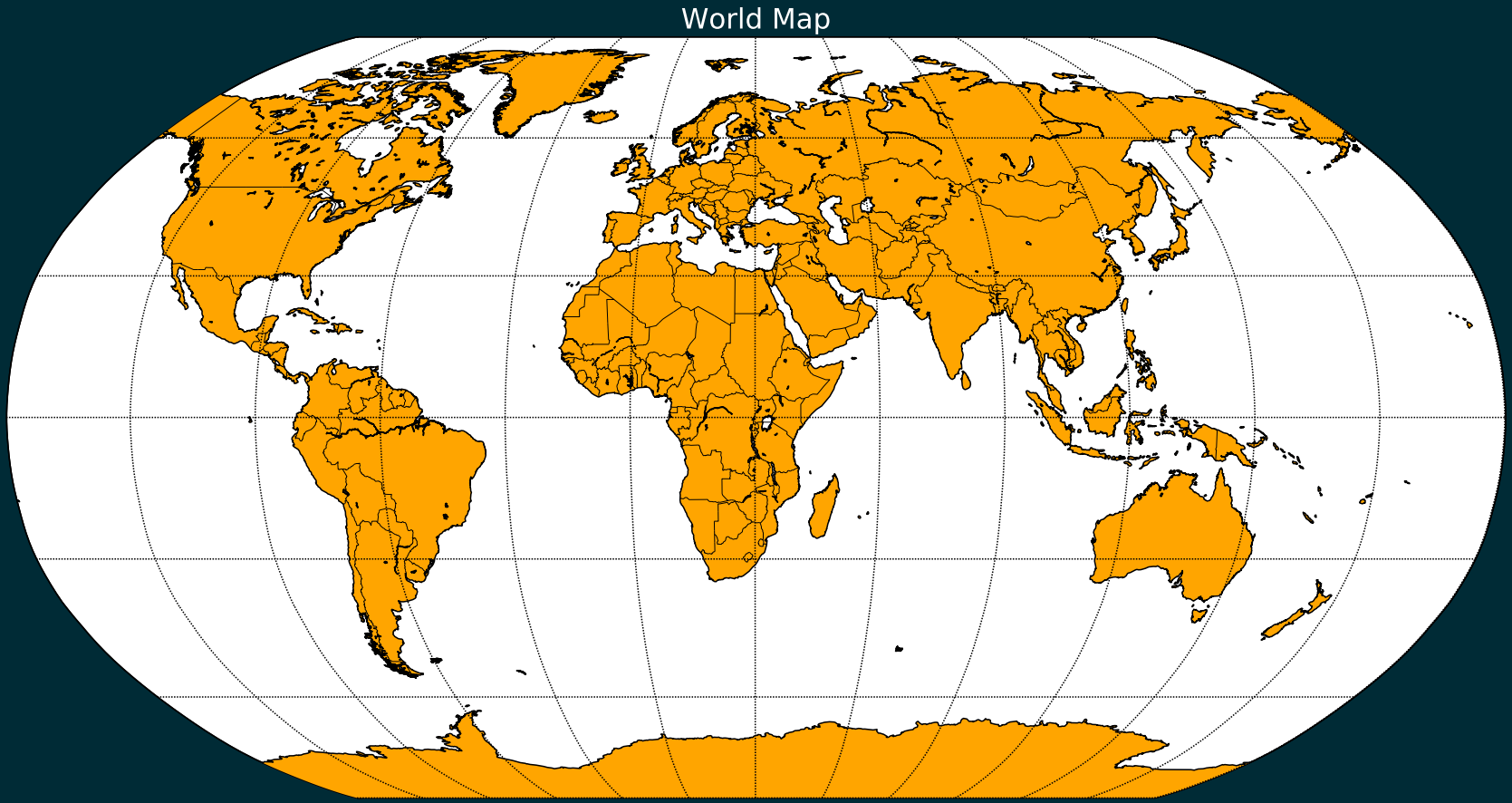
```
>>> create_map = feed.create_google_map(style="titled")
>>> feed.write_google_map("map.html", style="titled")
```

MATPLOTLIB BASEMAP TOOLKIT

http://introtopython.org/visualization_earthquakes.html

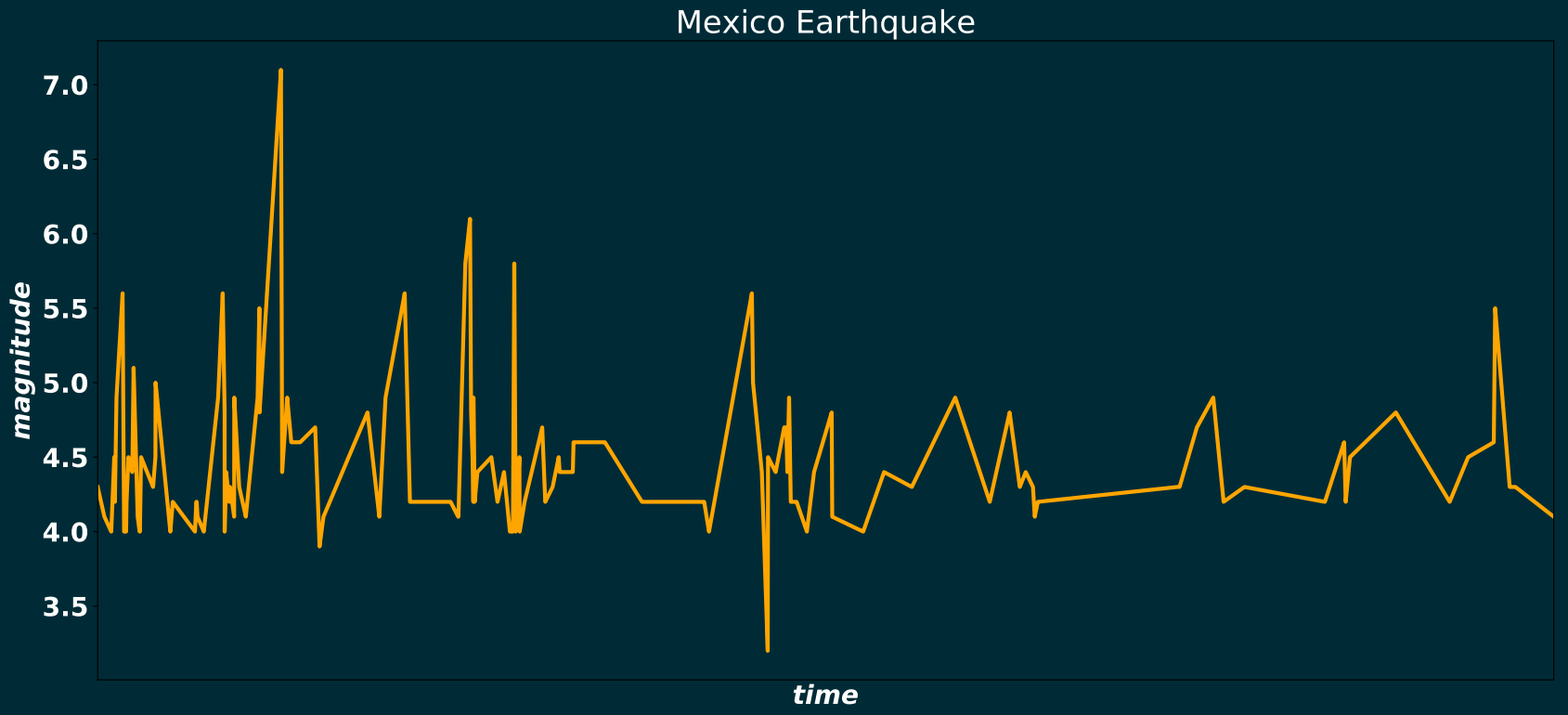
```
from mpl_toolkits.basemap import Basemap
import matplotlib.pyplot as plt
import numpy as np

plt.figure()
my_map = Basemap(projection='ortho',
                 lat_0=22,  lon_0=30.22,
                 resolution='h')
my_map.drawcoastlines()




plt.show()
```

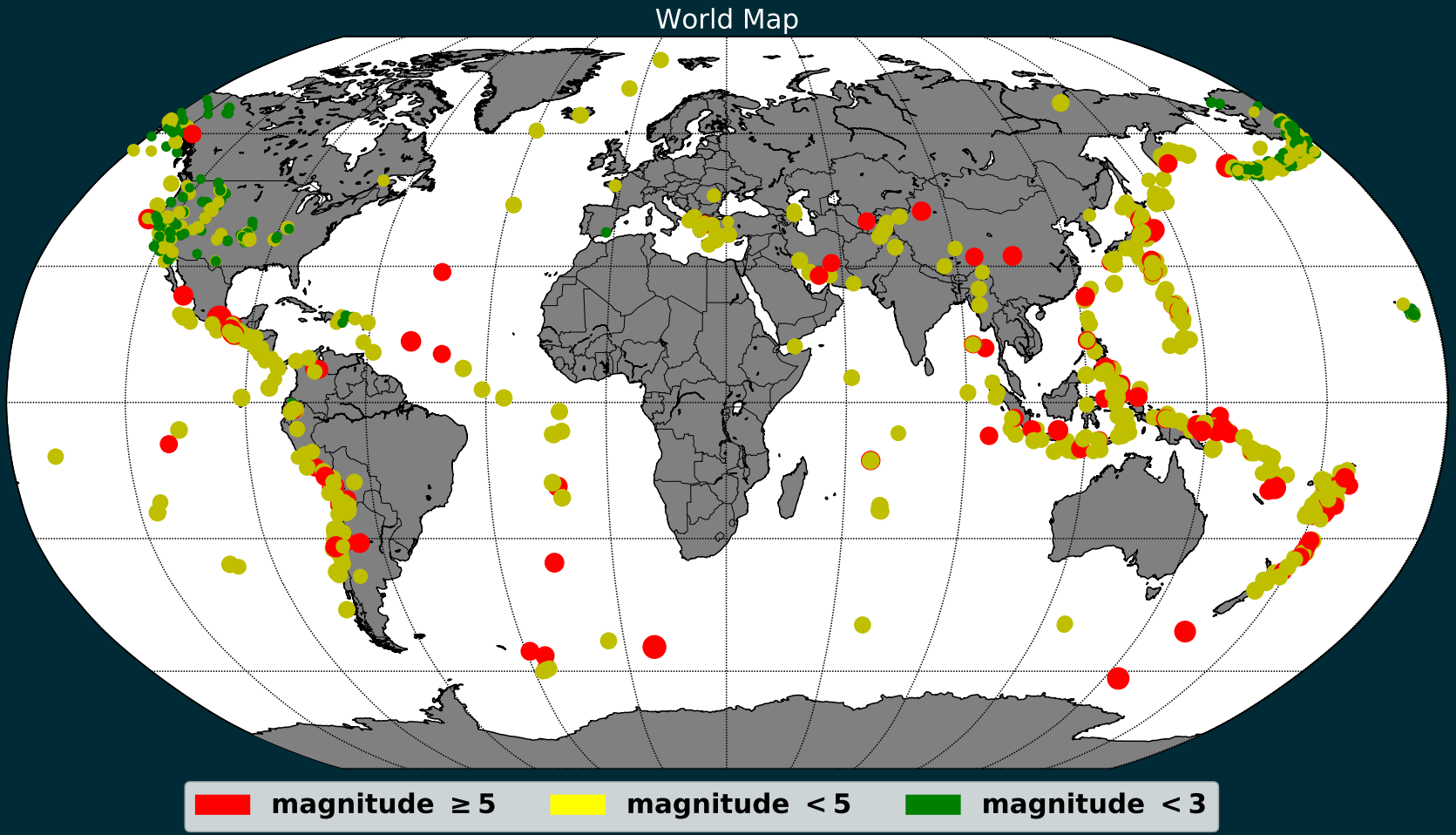
```
from mpl_toolkits.basemap import Basemap
import matplotlib.pyplot as plt
import numpy as np

plt.figure()
my_map = Basemap(projection='ortho',
                 lat_0=22,  lon_0=30.22,
                 resolution='h')
my_map.drawcoastlines()
my_map.drawcountries()
my_map.fillcontinents(color='orange')
my_map.drawmapboundary()

meridians = np.arange(0, 360, 30)
parallels = np.arange(-90, 90, 30)
my_map.drawmeridians(meridians)
my_map.drawparallels(parallels)

plt.show()
```

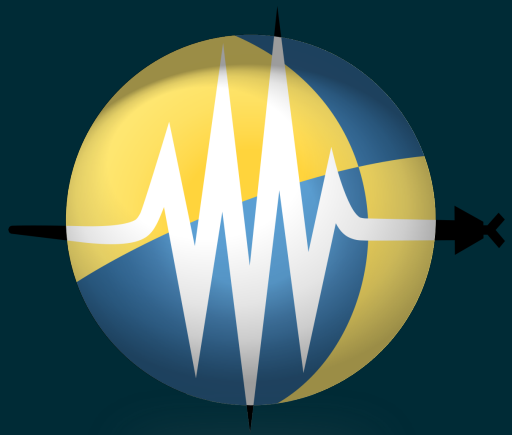

World Map

```
plt.figure()
my_map = Basemap(projection='merc',
                 lat_0=40, lon_0=19,
                 resolution = 'h',
                 llcrnrlon=20.577,
                 llcrnrlat=33.568
                 urcrnrlon=28.1905,
                 urcrnrlat=39.701)

my_map.drawcoastlines()
my_map.drawcountries()
my_map.fillcontinents(color='orange')




plt.axis('off')
plt.show()
```

```
plt.figure()
my_map = Basemap(projection='merc',
                 lat_0=40, lon_0=19,
                 resolution = 'h',
                 llcrnrlon=20.577,
                 llcrnrlat=33.568
                 urcrnrlon=28.1905,
                 urcrnrlat=39.701)

my_map.drawcoastlines()
my_map.drawcountries()
my_map.fillcontinents(color='orange')

x,y = my_map(lons, lats)
my_map.plot(x, y, 'ro', markersize=10)

plt.axis('off')
plt.show()
```


Mexico Earthquake
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
magnitude
time

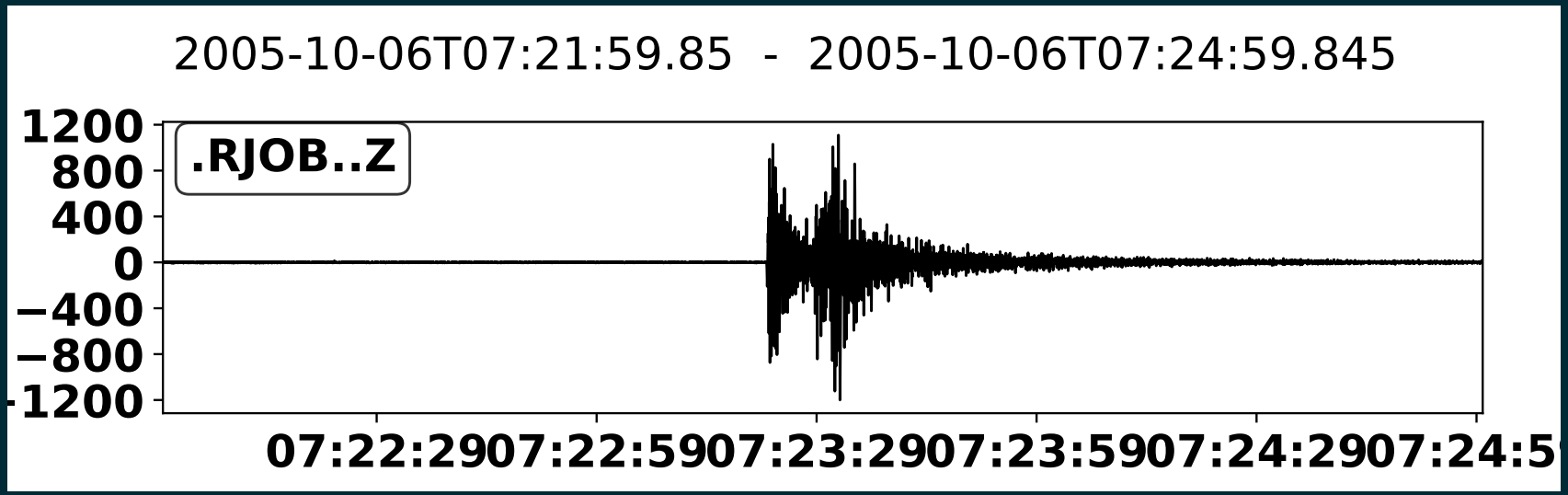

World Map
magnitude ≥ 5
magnitude < 5
magnitude < 3



ObsPy

A Python Framework for Seismology

https://github.com/obspy/obspy/wiki


2005-10-06T07:21:59.85 - 2005-10-06T07:24:59.845
.RJOB..Z
1200
800
400
0
−400
−800
−1200
07:22:29
07:22:59
07:23:29
07:23:59
07:24:29
07:24:5

```
>>> import quakefeeds
>>> import earthquakes
>>> from mpl_toolkits.basemap import Basemap
>>> import obspy
```

@NikoletaGlyn

https://github.com/Nikoleta-v3