

# Arruma dados de onda do ERA5

Carrega dados de onda do ERA5 de um arquivo NetCDF.

O arquivo NetCDF (.nc) foi baixado usando a API fornecida em

<https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels?tab=form>

Seleciona o ponto (mais próximo do ADCP, que é o mesmo do WW3)

```
In [16]: import numpy as np
import matplotlib.pyplot as plt
import netCDF4
import pickle
```

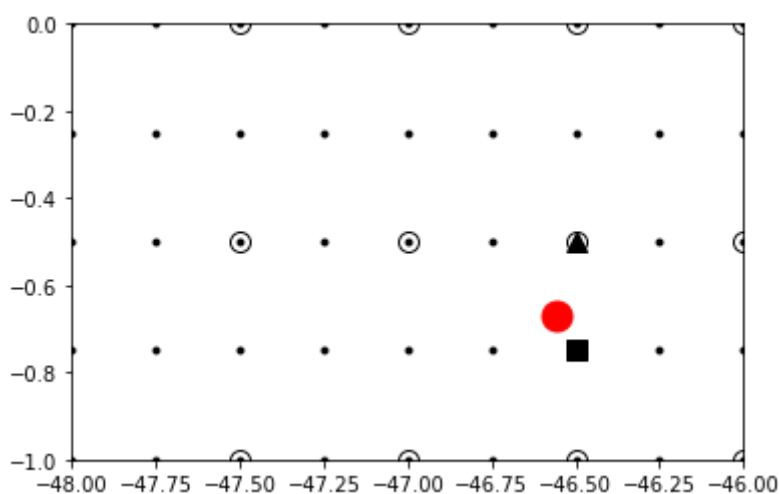
Python - NetCDF reading and writing example with plotting

[http://schubert.atmos.colostate.edu/~cslocum/netcdf\\_example.html](http://schubert.atmos.colostate.edu/~cslocum/netcdf_example.html)

Figura copiada do 'Vento\_ERA5\_WW3.ipynb', que mostra as coordenadas dos modelos e a posição do ADCP

Resolução do modelo de onda é 0,5o = WW3

DATA DESCRIPTION	
Data type	Gridded
Projection	Regular latitude-longitude grid
Horizontal coverage	Global
Horizontal resolution	Reanalysis: 0.25° x 0.25° (atmosphere), 0.5° x 0.5° (ocean waves) Mean, spread and members: 0.5° x 0.5° (atmosphere), 1° x 1° (ocean waves)



```
In [10]: mod = netCDF4.Dataset('ERA_waves_download.nc')

# para descobrir os campos das variáveis

for i in mod.variables:
    print([i, mod.variables[i].units, mod.variables[i].shape])
```

```
['longitude', 'degrees_east', (7,)]
['latitude', 'degrees_north', (6,)]
['time', 'hours since 1900-01-01 00:00:00.0', (26304,)]
['mwd', 'Degree true', (26304, 6, 7)]
['mwp', 's', (26304, 6, 7)]
['swh', 'm', (26304, 6, 7)]
```

In [19]:

```
lat = mod.variables['latitude'][:]
lon = mod.variables['longitude'][:]

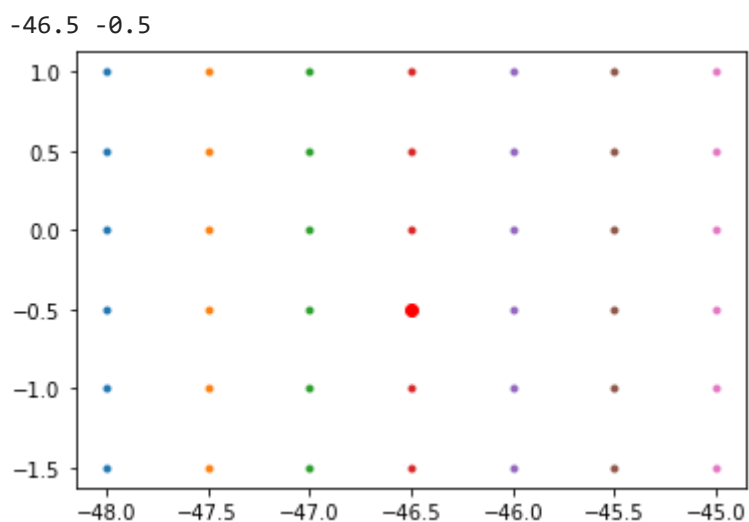
lat = np.array(lat)
lon = np.array(lon)

lonlon, latlat = np.meshgrid(lon, lat)

plt.plot(lonlon, latlat, '.')

# pra ter certeza que estamos pegando o ponto correto!!!!
px = 3
py = 3
plt.plot(lonlon[py, px], latlat[py, px], 'ro')
print(lonlon[py, px], latlat[py, px])

plt.show()
```



In [13]:

```
# pega as séries de altura, período e direção para o ponto

wh = mod.variables['swh'][:, py, px]
wp = mod.variables['mwp'][:, py, px]
wd = mod.variables['mwd'][:, py, px]

wh.shape
```

Out[13]: (26304,)

In [12]:

```
# Transforma o tempo da Reanalysis em tempo yy mm dd hh...

#https://stackoverflow.com/questions/60958754/typeerror-class-cftime-cftime-datetime

pega_tempo = mod.variables['time']

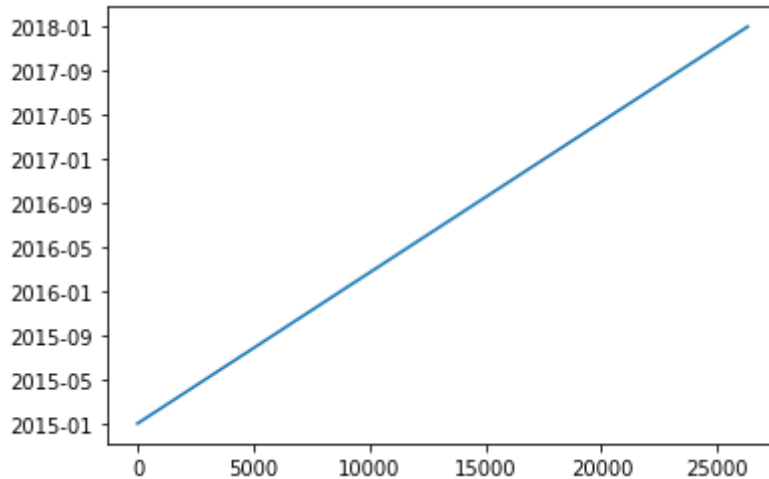
tempo = netCDF4.num2date(pega_tempo, pega_tempo.units, only_use_cftime_datetimes=False)
```

```
print(tempo[0])
print(tempo[0:3])
```

```
2015-01-01 00:00:00
[real_datetime(2015, 1, 1, 0, 0) real_datetime(2015, 1, 1, 1, 0)
 real_datetime(2015, 1, 1, 2, 0)]
```

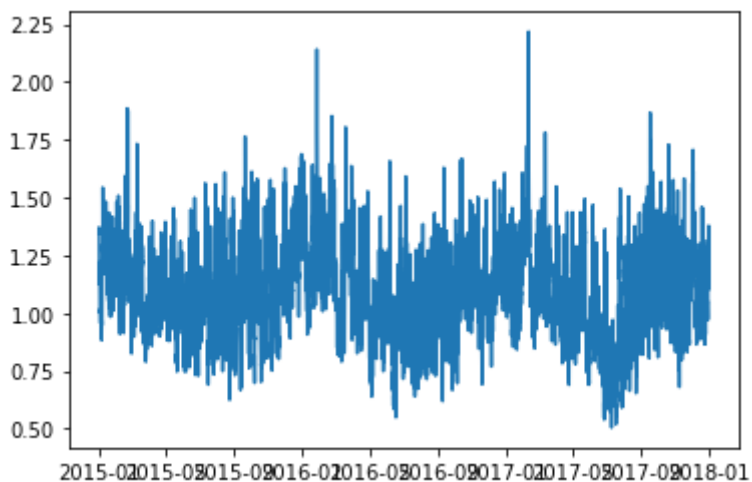
```
In [9]: plt.plot(tempo)
```

```
Out[9]: [<matplotlib.lines.Line2D at 0x19385997610>]
```



```
In [14]: plt.plot(tempo, wh)
```

```
Out[14]: [<matplotlib.lines.Line2D at 0x193881d18b0>]
```



```
In [18]: hdr = '''
Dados de onda do ERA5 para coordenadas

longitude: -46.5
latitude: -0.5

para o período de 2015 até 2017

[tempo, altura, periodo, direcao]
'''

j = [hdr, tempo, wh, wp, wd]

# with open('Ondas_ERA5_2015_2017.pkl', 'wb') as io:
#     pickle.dump(j, io)
```

