trial3

July 17, 2020

Trial Envi Contour Plot with WDRT

[1]:
```
import numpy as np
import scipy.io
import WDRT.ESSC as ESSC
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
import scipy.interpolate as interp
import WDRT.longTermExtreme as lte
import WDRT.shortTermExtreme as ste
import h5py
import os
import csv
```

[2]:
```
# Load data from example_envSampling.py
#envFile = h5py.File(os.path.join(r'data', 'NDBC46022.h5'), 'r')
#envFile = h5py.File(os.path.join(r'data/NDBC46022.h5'), 'r')
#Hs_Return = np.array(envFile['ReturnContours/Hs_Return'])
#T_Return = np.array(envFile['ReturnContours/T_Return'])
#Hs_sample = np.array(envFile['Samples_ContourApproach/Hs_SampleCA'])
#T_sample = np.array(envFile['Samples_ContourApproach/T_SampleCA'])
data=np.genfromtxt('siteTestdata.txt', delimiter="" , skip_header=1)
```

[3]:
```
# Some characteristics of the data
print(data[:5]) #first 5 rows
print(data.ndim) # of dimensions e.g. 2 for 2-D array
print(data.size)# size of dimension
print(data.shape)# product of this gives size size
data.dtype # data type(s)
```

```
[[4.39000e-01 7.01100e+00 1.97900e+03 1.00000e+00 1.00000e+00 0.00000e+00
  6.92496e+05 1.43000e+00]
 [4.83000e-01 7.01700e+00 1.97900e+03 1.00000e+00 1.00000e+00 3.00000e+00
  6.92499e+05 2.07000e+00]
 [4.93000e-01 7.03600e+00 1.97900e+03 1.00000e+00 1.00000e+00 6.00000e+00
  6.92502e+05 2.93000e+00]
 [4.76000e-01 7.03500e+00 1.97900e+03 1.00000e+00 1.00000e+00 9.00000e+00
  6.92505e+05 3.21000e+00]
```

```
 [5.33000e-01 7.01400e+00 1.97900e+03 1.00000e+00 1.00000e+00 1.20000e+01
  6.92508e+05 3.74000e+00]]
2
935040
(116880, 8)
```

[3]:
```
dtype('float64')
```

[4]:
```
#Slicing up the data
swh=data[:,0] #significant wave height
pwp=data[:,1] #significant wave period
year=data[:,2]#years over which data is extended
month=data[:,3]#mohths of the year
day=data[:,4]#days per week
hour=data[:,5]# time step over which data is recorded; 3hrs in this case. Hence␣
 ↪3hr storms.
dateNum=data[:,6]#numeric values for the date
wind=data[:,7]# wind speed
print(swh)
print(pwp)
print(wind)
print(swh.shape)
print(pwp.shape)
print(wind.shape)
```

```
[0.439 0.483 0.493 … 1.618 1.7   1.74 ]
[7.011 7.017 7.036 … 9.053 9.125 9.225]
[ 1.43  2.07  2.93 … 11.76 11.18 12.81]
(116880,)
(116880,)
(116880,)
```

[16]:
```
hs=np.array(swh)
tp=np.array(pwp)
y=np.array(year)
m=np.array(month)
d=np.array(day)
h=np.array(hour)
dn=np.array(dateNum)
```

[19]:
```
# Create buoy object
buoy16 = ESSC.Buoy('16','NDBC')
```

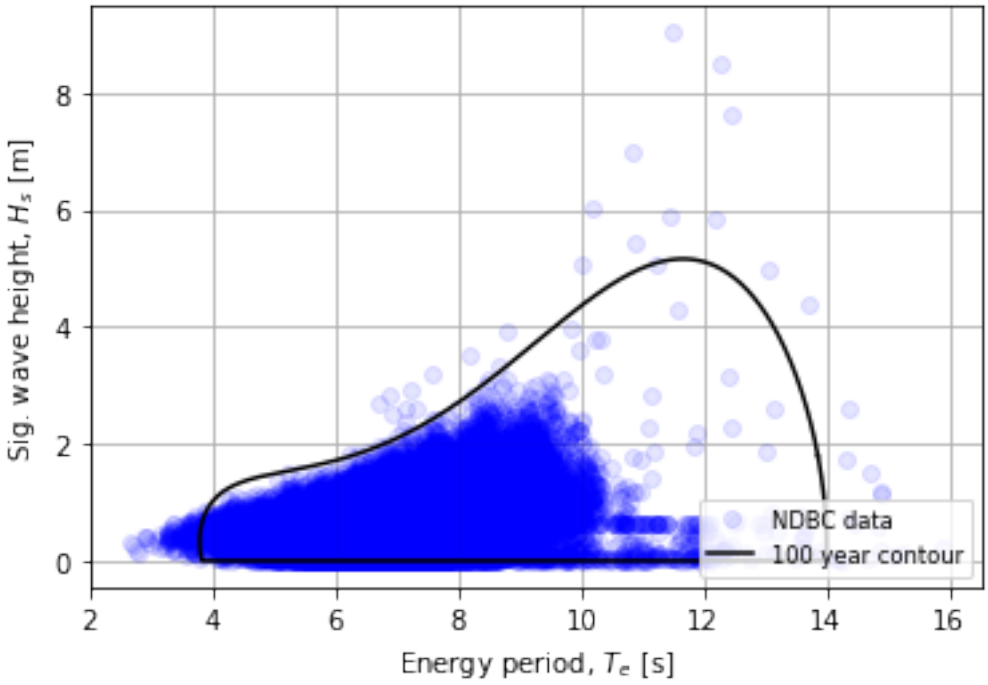
[20]:
```
buoy16.Hs=hs
buoy16.T=tp
buoy16.dateNum=dn
```

[21]:
```
# Declare required parameters
Time_SS = 1.   # Sea state duration (hrs)
Time_R = 100   # Return periods (yrs) of interest
```

[22]:
```
# Create PCA EA object for the buoy
pca16 = ESSC.PCA(buoy16)
```

[23]:
```
# Calculate contour using PCA method
pca_Hs_Return, pca_T_Return = pca16.getContours(Time_SS, Time_R)
```

[24]:
```
# Show a plot of the data
pca16.plotData()
```



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