

# trial2

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]#months 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,)
```

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

```
[6]: import pandas as pd
import csv
```

```
[79]: #df = pd.read_fwf('data.txt')
#a=df.to_csv('data.csv')
#type(a)
```

```
[9]: #hf.close()
```

```
[10]: 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)
```

```
[11]: #Create .h5 file and write info to it
hf= h5py.File('data.h5', 'w')
hf.create_dataset('Hs', data=hs)# Hs
hf.create_dataset('Tp', data=tp)#Tp
#hf.create_dataset('c', data=y)#year
#d=hf.create_dataset('d', data=m)#month
#hf.create_dataset('e', data=d)#day
#hf.create_dataset('h', data=h)#hour
#g1=hf.create_group('dateList')
#g1.create_dataset('year', data=y)
#g1.create_dataset('month', data=m)
#g1.create_dataset('day', data=d)
#g1.create_dataset('hour', data=h)
hf.create_dataset('dateNum', data=dn)

hf.close()
```

```
[12]: #Openthe .h5 file into the python workspace
hf= h5py.File('data.h5', 'r')
list(hf)
#G1=hf.get('dateList')
#G1_items=list(G1.items())
#print(G1_items)
#day=np.array(G1.get('day'))
#print(day)
#t1=(hfprint(hf)
#print(hf["/"/])
```

```
[12]: ['Hs', 'Tp', 'dateNum']
```

```
[ ]:
```

```
[23]: #hs=(hf['Hs'])
#tp=(envFile['buoy_Data']['dateList'])
#b=np.array(hs)
#d=np.array(tp)

#from numpy import savetxt
#savetxt('swh.csv', b, delimiter='')
```

```
[13]: # Declare required parameters
Time_SS = 1. # Sea state duration (hrs)
```

```
Time_R = 100 # Return periods (yrs) of interest
```

```
[14]: # Load data from .h5 file if available
dataPath = os.path.join('NDBC46022', 'data.h5')
#envFile = h5py.File(os.path.join(r'data', 'NDBC46022.h5'), 'r')
buoy16.loadFromH5(dataPath)
```

Reading from: NDBC46022\data.h5

↳

-----

↳ KeyError

↳ last)

```
<ipython-input-14-0963db5fcfe5> in <module>
      2 dataPath = os.path.join('NDBC46022', 'data.h5')
      3 #envFile = h5py.File(os.path.join(r'data', 'NDBC46022.h5'), 'r')
----> 4 buoy16.loadFromH5(dataPath)
```

c:

↳ \users\awhite15\appdata\local\programs\python\python36\lib\site-packages\WDRT\ESSC.

↳ py in loadFromH5(self, fileName)

3000 except IOError:

3001 raise IOError("Could not find file: " + fileName)

-> 3002 self.Hs = np.array(f['buoy\_Data/Hs'][:])

3003 self.T = np.array(f['buoy\_Data/Te'][:])

3004 self.dateNum = np.array(f['buoy\_Data/dateNum'][:])

h5py\\_objects.pyx in h5py.\_objects.with\_phil.wrapper()

h5py\\_objects.pyx in h5py.\_objects.with\_phil.wrapper()

c:

↳ \users\awhite15\appdata\local\programs\python\python36\lib\site-packages\h5py\\_hl\group.

↳ py in \_\_getitem\_\_(self, name)

262 raise ValueError("Invalid HDF5 object reference")

263 else:

--> 264 oid = h5o.open(self.id, self.\_e(name), lapl=self.\_lapl)

265

266 otype = h5i.get\_type(oid)

I believe the error is related to the text encircled below. The NDBC46022.h5 file has a group called buoy\_Data. Inside of buoy\_Data are the dataset Hs and Tp and dataNUM as well as a subgroup called dateList. From what I see below, the info in dateList is not used. I realize it is not recognizing the .h5 file that I have created as it says couldn't find file. Maybe I am not loading file correctly. Also it is looking for files with the same names created by NREL, not sure if this is so. In other words it will look for a group called buoy\_Data and read from there.

```
h5py\_objects.pyx in h5py._objects.with_phil.wrapper()
```

```
h5py\_objects.pyx in h5py._objects.with_phil.wrapper()
```

```
h5py\h5o.pyx in h5py.h5o.open()
```

```
KeyError: 'Unable to open object (component not found)'
```

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

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