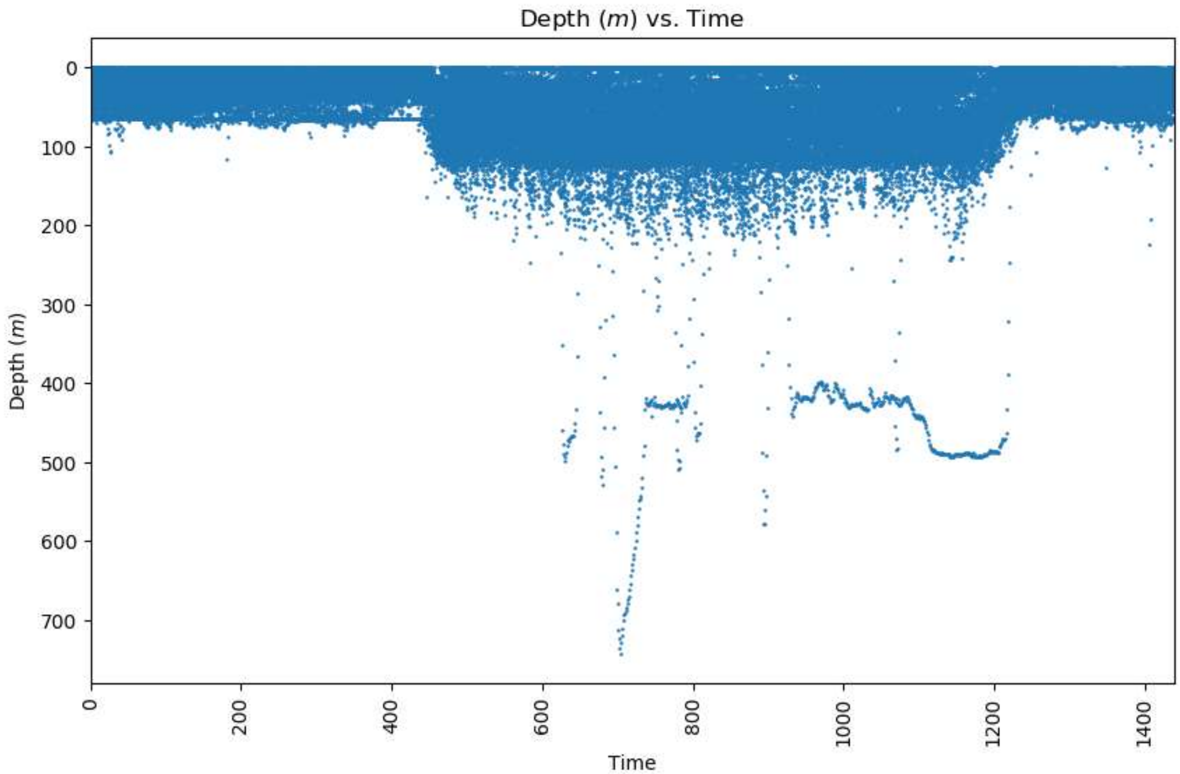
In [44]:
```
%matplotlib inline
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb
from pprint import pprint
from pandas.plotting import andrews_curves
plt.style.use('default')
```

In [145]:
```
data = pd.read_csv('A15226.txt', sep="\t")
data['Date'] = pd.to_datetime(data['Date local DST']).dropna()
DATES = data['Date'].tolist()
dates, times = [], []
for _ in DATES:
    dates.append(_.date())
    times.append(_.time())
t, times = times, []
for time in t:
    times.append(60*time.hour + time.minute)
data['Date'] = dates
data['Time'] = times
data = data[['Date', 'Time', 'Depth (m)', 'Temp (C)']]
data.columns = ['Date', 'Time', 'D', 'T']
data.head()
```

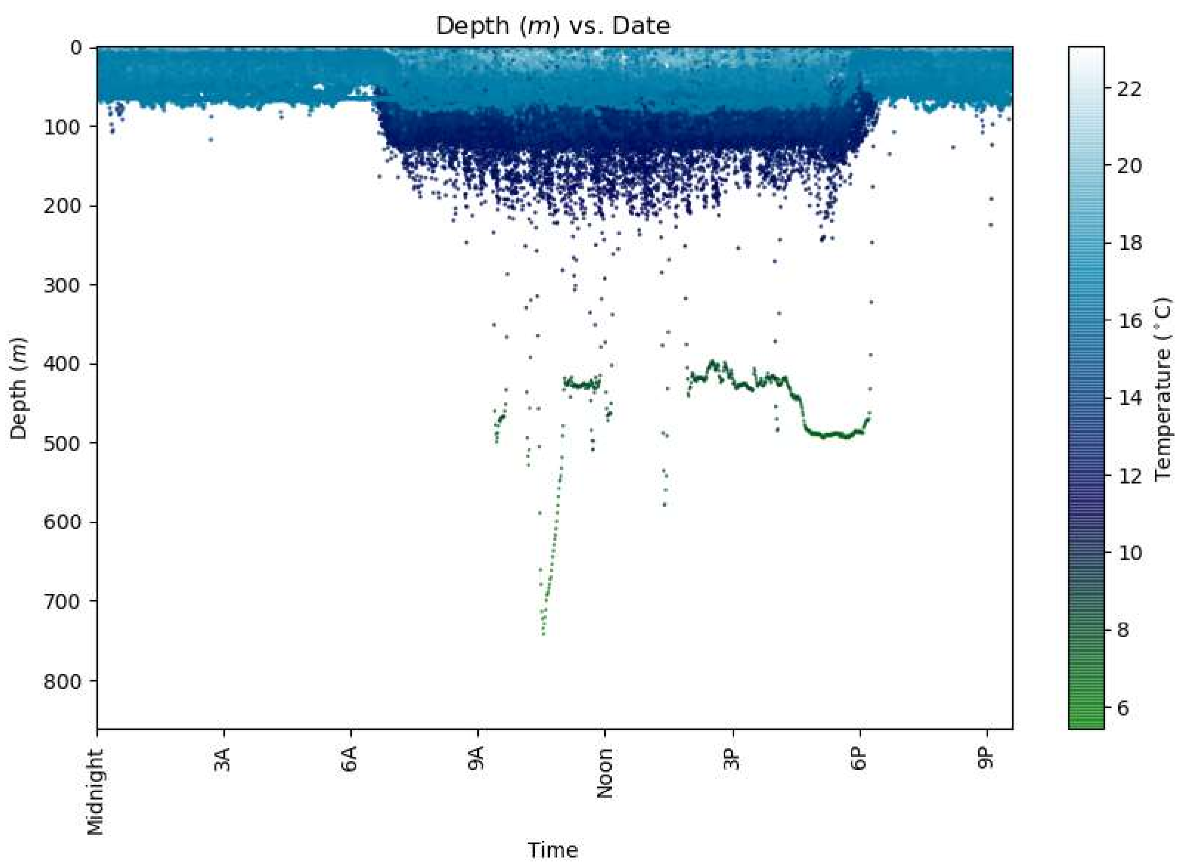
Out[145]:

	Date	Time	D	T
0	2019-03-17	932	0.87	22.766
1	2019-03-17	933	54.87	16.609
2	2019-03-17	934	70.87	13.938
3	2019-03-17	935	74.87	13.266
4	2019-03-17	936	74.37	13.172

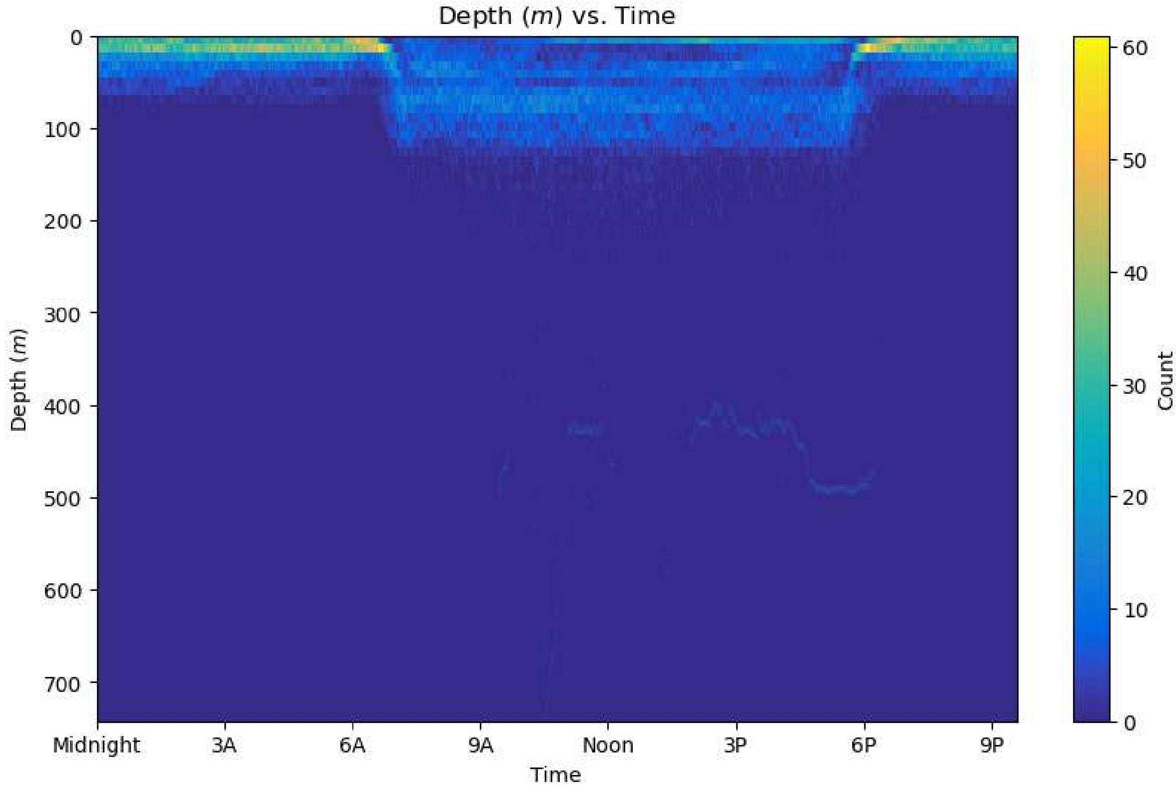
In [246]:
```
plt.figure(figsize=(10, 6))
plt.plot(data['Time'], data['D'], '.', markersize=1.618)
plt.xticks(rotation=90)
plt.xlim(data['Time'].min(), data['Time'].max())
plt.xlabel('Time')
plt.ylabel('Depth ($m$)')
plt.gca().invert_yaxis()
plt.title('Depth ($m$) vs. Time')
plt.show()
```



In [244]:
```
fig, ax1 = plt.subplots()
fig.set_size_inches(10, 6)

#labels
ax1.set_xlabel('Time')
ax1.set_ylabel('Depth ($m$)')
ax1.set_title('Depth ($m$) vs. Date')

#c sequence
c = data['T']

#plot
plt.scatter( data['Time'], data['D'] , c=c,
            cmap = 'ocean', s = data['T']*.4, alpha=0.618, marker='.')
cbar = plt.colorbar()
plt.xticks(rotation=90)
plt.xlim(data['Time'].min(), data['Time'].max())
plt.ylim(1.1618*data['D'].min(), 1.1618*data['D'].max())

plt.gca().invert_yaxis()
labels=['Midnight', '3A', '6A', '9A', 'Noon', '3P', '6P', '9P']

ax1.xaxis.set_ticklabels(labels)
cbar.set_label('Temperature ($^\circ$C)')
```



In [272]:
```
bins = np.linspace(0, data['D'].max(), 80)
x, y = times, bins
# generate 2 2d grids for the x & y bounds
x, y = np.meshgrid(x, y)
times = list(set(data['Time'].tolist()))
d = []
for time in times:
    temp = data[data.Time == time].dropna()
    hist, bins = np.histogram(temp['D'].tolist(), bins=bins)
    d.append(hist)

z = np.array(d).T
# x and y are bounds, so z should be the value *inside* those bounds.
# Therefore, remove the last value from the z array.
z_min, z_max = 0, np.abs(z).max()

fig, ax = plt.subplots()
fig.set_size_inches(10, 6)
c = ax.pcolormesh(x, y, z, cmap=parula_map, vmin=z_min, vmax=z_max)
ax.set_title('Depth ($m$) vs. Time')
# set the limits of the plot to the limits of the data
ax.axis([x.min(), x.max(), y.min(), y.max()])
fig.colorbar(c, ax=ax, label='Count')
plt.gca().invert_yaxis()
plt.xlabel('Time')

labels = ['Midnight', '3A', '6A', '9A', 'Noon', '3P', '6P', '9P']

ax.xaxis.set_ticklabels(labels)
plt.ylabel('Depth ($m$)')
asdf = data[data['D'] > 300]
plt.plot(asdf['Time'], asdf['D'], '.', mfc='none', markersize=2, alpha=0.1)
plt.show()
```


Depth (m) vs. Time
Depth (m)
0
100
200
300
400
500
600
700
Midnight
3A
6A
9A
Noon
3P
6P
9P
Time
Count
60
50
40
30
20
10
0

In [222]:
```
from matplotlib.colors import LinearSegmentedColormap

cm_data = [[0.2081, 0.1663, 0.5292], [0.2116238095, 0.1897809524, 0.5776761905
],
 [0.212252381, 0.2137714286, 0.6269714286], [0.2081, 0.2386, 0.6770857143],
 [0.1959047619, 0.2644571429, 0.7279], [0.1707285714, 0.2919380952,
  0.779247619], [0.1252714286, 0.3242428571, 0.8302714286],
 [0.0591333333, 0.3598333333, 0.8683333333], [0.0116952381, 0.3875095238,
  0.8819571429], [0.0059571429, 0.4086142857, 0.8828428571],
 [0.0165142857, 0.4266, 0.8786333333], [0.032852381, 0.4430428571,
  0.8719571429], [0.0498142857, 0.4585714286, 0.8640571429],
 [0.0629333333, 0.4736904762, 0.8554380952], [0.0722666667, 0.4886666667,
  0.8467], [0.0779428571, 0.5039857143, 0.8383714286],
 [0.079347619, 0.5200238095, 0.8311809524], [0.0749428571, 0.5375428571,
  0.8262714286], [0.0640571429, 0.5569857143, 0.8239571429],
 [0.0487714286, 0.5772238095, 0.8228285714], [0.0343428571, 0.5965809524,
  0.819852381], [0.0265, 0.6137, 0.8135], [0.0238904762, 0.6286619048,
  0.8037619048], [0.0230904762, 0.6417857143, 0.7912666667],
 [0.0227714286, 0.6534857143, 0.7767571429], [0.0266619048, 0.6641952381,
  0.7607190476], [0.0383714286, 0.6742714286, 0.743552381],
 [0.0589714286, 0.6837571429, 0.7253857143],
 [0.0843, 0.6928333333, 0.7061666667], [0.1132952381, 0.7015, 0.6858571429],
 [0.1452714286, 0.7097571429, 0.6646285714], [0.1801333333, 0.7176571429,
  0.6424333333], [0.2178285714, 0.7250428571, 0.6192619048],
 [0.2586428571, 0.7317142857, 0.5954285714], [0.3021714286, 0.7376047619,
  0.5711857143], [0.3481666667, 0.7424333333, 0.5472666667],
 [0.3952571429, 0.7459, 0.5244428571], [0.4420095238, 0.7480809524,
  0.5033142857], [0.4871238095, 0.7490619048, 0.4839761905],
 [0.5300285714, 0.7491142857, 0.4661142857], [0.5708571429, 0.7485190476,
  0.4493904762], [0.609852381, 0.7473142857, 0.4336857143],
 [0.6473, 0.7456, 0.4188], [0.6834190476, 0.7434761905, 0.4044333333],
 [0.7184095238, 0.7411333333, 0.3904761905],
 [0.7524857143, 0.7384, 0.3768142857], [0.7858428571, 0.7355666667,
  0.3632714286], [0.8185047619, 0.7327333333, 0.3497904762],
 [0.8506571429, 0.7299, 0.3360285714], [0.8824333333, 0.7274333333, 0.3217],
 [0.9139333333, 0.7257857143, 0.3062761905], [0.9449571429, 0.7261142857,
  0.2886428571], [0.9738952381, 0.7313952381, 0.266647619],
 [0.9937714286, 0.7454571429, 0.240347619], [0.9990428571, 0.7653142857,
  0.2164142857], [0.9955333333, 0.7860571429, 0.196652381],
 [0.988, 0.8066, 0.1793666667], [0.9788571429, 0.8271428571, 0.1633142857],
 [0.9697, 0.8481380952, 0.147452381], [0.9625857143, 0.8705142857, 0.1309],
 [0.9588714286, 0.8949, 0.1132428571], [0.9598238095, 0.9218333333,
  0.0948380952], [0.9661, 0.9514428571, 0.0755333333],
 [0.9763, 0.9831, 0.0538]]

parula_map = LinearSegmentedColormap.from_list('parula', cm_data)
# For use of "viscm view"
test_cm = parula_map
```

In [ ]: