

## PMDS508L - Python Programming Python Pandas Plotting Abilities

### Plotting in Pandas

For working with the below code you require to download the data file WQ.xlsx from <https://bsrvp.github.io/PythonClass/WQ.xlsx> and save it in the same directory where is your Jupyter Notebook is saved.

```
[1]: import pandas as pd  
import numpy as np
```

```
[2]: WQData = pd.read_excel('WQ.xlsx')
```

**Note:** You can directly read the excel from the web URL (if you are connected to net). For reading the data from a web URL you need to use the following command:

```
WQData = pd.read_excel(r'https://bsrvp.github.io/PythonClass/WQ.xlsx')
```

```
[3]: WQData
```

```
[3]:
```

	St. No	Depth	S.D	W.T	Salinity	Turbidity	DO	pH	TSM \
0	1	1.00	1.000	29.5	10.0	5.21	8.37	9.05	18.000
1	2	2.25	0.500	30.0	10.4	16.00	6.90	8.27	23.200
2	3	2.50	0.500	29.6	11.8	13.70	6.79	8.27	26.800
3	4	1.85	NaN	29.6	10.7	3.72	5.17	8.64	22.600
4	5	1.50	1.500	29.3	11.7	4.22	6.46	8.70	18.000
5	6	2.25	1.000	30.1	12.6	7.46	6.18	8.30	22.200
6	7	2.35	0.750	29.8	13.9	10.50	6.98	8.28	14.500
7	8	0.25	0.250	31.2	13.4	11.00	7.12	8.26	15.400
8	9	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
9	10	2.50	0.500	30.1	15.1	9.72	6.54	8.31	11.200
10	11	0.75	0.750	29.0	14.8	4.48	8.36	8.53	9.440
11	12	1.75	0.500	30.6	15.5	19.20	6.73	8.38	19.200
12	13	2.15	1.000	28.5	17.6	6.68	6.82	8.35	1.279
13	14	1.25	0.750	28.6	18.0	11.70	4.87	8.39	14.500
14	15	2.25	0.250	30.4	19.3	24.80	8.20	8.33	51.500
15	16	1.75	0.250	30.2	20.0	28.10	7.12	8.27	31.700
16	17	1.25	0.250	30.3	24.9	27.30	6.05	7.96	41.400
17	18	0.50	0.010	31.8	34.2	13.80	10.60	8.11	170.200
18	19	1.65	0.750	31.6	12.7	2.65	10.30	9.27	10.200

19	20	1.75	0.250	31.1	21.8	26.84	6.94	8.49	49.100
20	21	1.25	0.250	30.9	18.1	20.00	7.40	8.10	56.300
21	22	0.80	0.250	33.0	5.4	15.20	7.50	8.30	25.200
22	23	1.25	1.250	30.1	7.0	1.80	6.00	9.61	18.800
23	24	1.25	0.500	31.1	17.1	4.89	7.25	8.80	25.300
24	25	1.25	0.250	32.0	12.3	17.90	7.95	8.33	23.200
25	26	1.00	0.500	33.0	4.5	13.80	7.40	8.47	21.100
26	27	0.75	0.015	34.2	4.5	52.40	7.75	8.50	113.000
27	28	0.80	0.010	33.4	27.7	34.50	9.85	8.56	85.300
28	29	0.80	0.250	33.0	10.9	29.10	9.50	8.50	33.000
29	30	0.75	0.350	32.6	6.4	28.40	7.59	8.30	27.000
30	31	0.75	0.750	30.3	19.8	10.20	6.00	7.90	29.000
31	32	0.75	0.250	31.9	14.2	28.50	6.75	8.17	36.800
32	33	2.75	0.010	32.1	0.0	55.60	5.22	7.53	35.480
33	34	2.25	0.500	30.2	35.0	14.80	7.92	8.22	29.400
34	35	3.25	1.000	28.5	35.0	9.43	6.04	8.09	19.900
35	36	3.25	1.250	29.0	35.3	5.88	6.66	8.13	9.400

	NH4-N	NO2-N	NO3-N	PO4-P	SiO2-Si	TN	TP
0	1.5	0.45	4.20	6.30	1.50	NaN	NaN
1	9.9	0.39	1.04	4.50	8.00	19.1	11.60
2	11.2	0.30	0.79	6.00	12.00	18.6	11.60
3	2.9	0.21	1.07	9.30	9.00	21.1	NaN
4	2.3	0.41	1.09	6.60	8.00	29.1	10.80
5	12.6	0.41	1.28	2.57	10.80	30.0	NaN
6	3.5	0.35	4.90	1.93	22.20	25.0	2.20
7	4.8	0.46	13.90	1.82	54.40	21.0	1.10
8	NaN	NaN	NaN	NaN	NaN	NaN	NaN
9	4.2	0.63	11.59	4.09	44.90	NaN	NaN
10	6.6	0.40	5.78	0.96	16.20	11.4	1.59
11	4.7	0.44	6.09	3.00	49.10	21.0	1.10
12	9.6	0.58	4.90	1.98	45.18	NaN	NaN
13	8.2	0.49	16.53	1.17	15.03	2.0	NaN
14	0.2	0.15	0.79	0.56	19.80	1.0	6.40
15	2.2	0.24	1.35	0.50	22.50	5.1	17.40
16	0.2	0.18	1.17	0.39	22.80	2.8	2.60
17	2.8	1.00	0.93	1.80	7.00	15.8	6.80
18	2.5	0.14	0.88	0.48	11.70	3.6	4.80
19	2.0	1.13	0.55	0.41	20.00	4.6	4.50
20	0.2	0.10	0.89	0.29	20.70	32.0	2.20
21	1.6	1.74	1.27	2.60	19.90	NaN	2.90
22	0.5	0.23	1.24	6.90	27.90	2.5	NaN
23	0.3	0.19	1.39	3.00	26.30	5.7	3.30
24	0.8	0.36	1.19	3.70	21.70	18.8	3.80
25	0.8	1.93	1.59	2.90	35.70	8.4	NaN
26	0.9	1.10	9.10	1.70	80.00	7.4	NaN
27	0.8	0.17	0.77	3.00	14.90	12.5	4.30

28	1.2	0.10	0.69	2.70	12.80	4.8	NaN
29	3.6	0.52	2.50	2.60	12.00	7.7	NaN
30	0.8	1.30	4.30	1.60	3.90	11.6	NaN
31	1.4	0.30	1.30	3.70	32.00	8.0	NaN
32	0.8	0.40	3.30	3.04	32.00	8.3	NaN
33	5.0	0.20	1.08	0.40	4.30	19.8	1.70
34	5.1	0.30	1.10	0.50	6.60	24.8	1.90
35	4.1	0.18	0.40	0.60	6.80	15.8	11.40

```
[4]: d = WQData['Depth'].tolist()
```

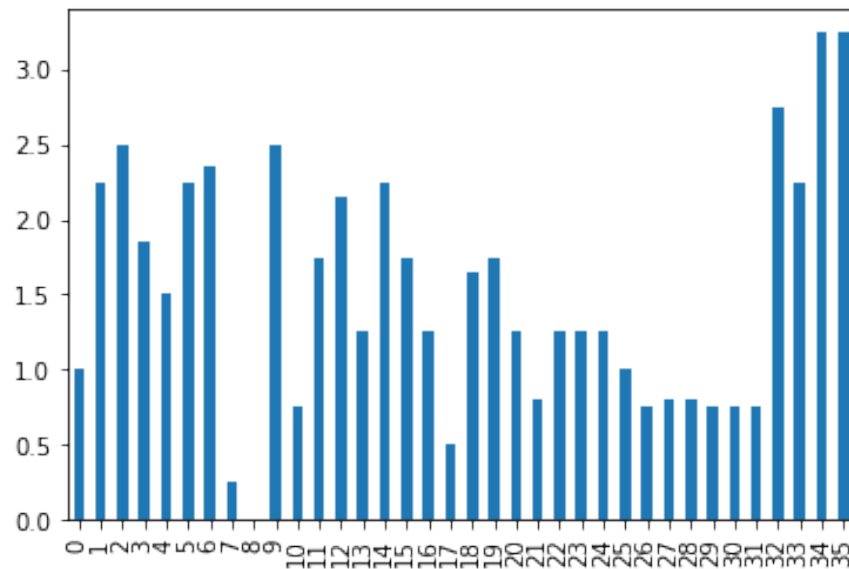
```
[5]: d
```

```
[5]: [1.0,  
      2.25,  
      2.5,  
      1.85,  
      1.5,  
      2.25,  
      2.35,  
      0.25,  
      nan,  
      2.5,  
      0.75,  
      1.75,  
      2.15,  
      1.25,  
      2.25,  
      1.75,  
      1.25,  
      0.5,  
      1.65,  
      1.75,  
      1.25,  
      0.8,  
      1.25,  
      1.25,  
      1.25,  
      1.0,  
      0.75,  
      0.8,  
      0.8,  
      0.75,  
      0.75,  
      0.75,  
      2.75,  
      2.25,
```

```
3.25,  
3.25]
```

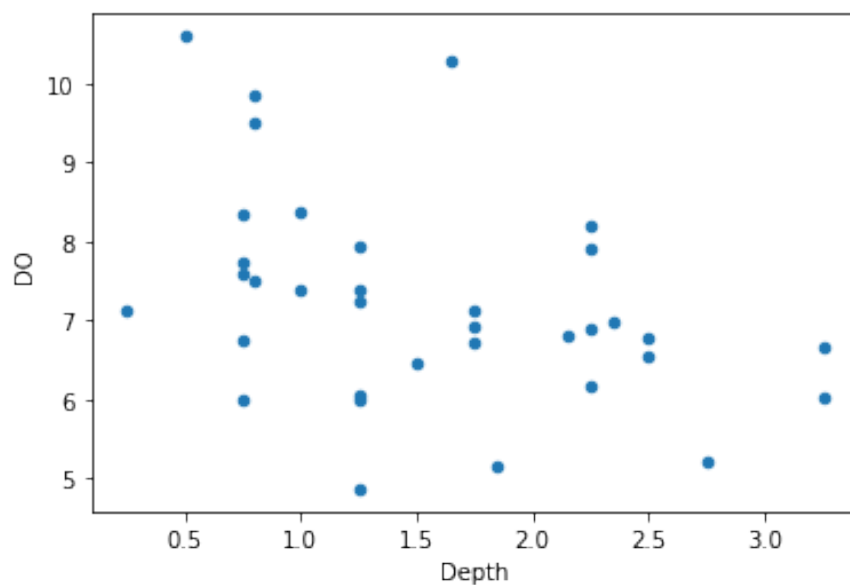
```
[6]: WQData['Depth'].plot.bar()
```

```
[6]: <AxesSubplot:>
```



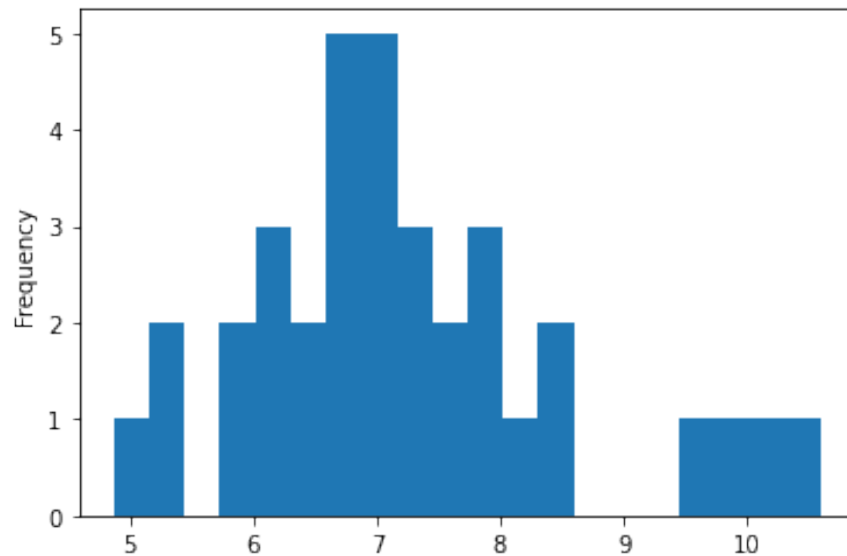
```
[7]: WQData.plot(kind='scatter', x = 'Depth', y = 'DO')
```

```
[7]: <AxesSubplot:xlabel='Depth', ylabel='DO'>
```



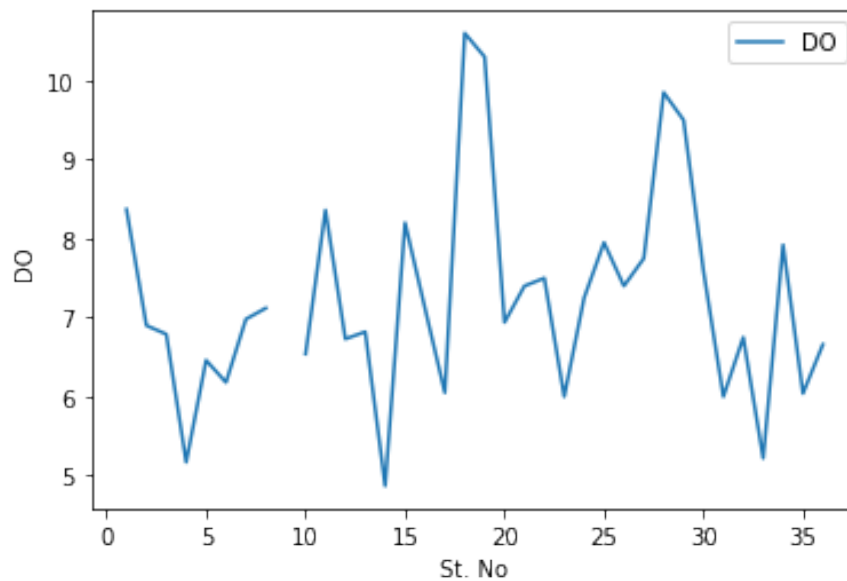
```
[8]: WQData['DO'].plot(kind='hist',bins=20)
```

```
[8]: <AxesSubplot:ylabel='Frequency'>
```



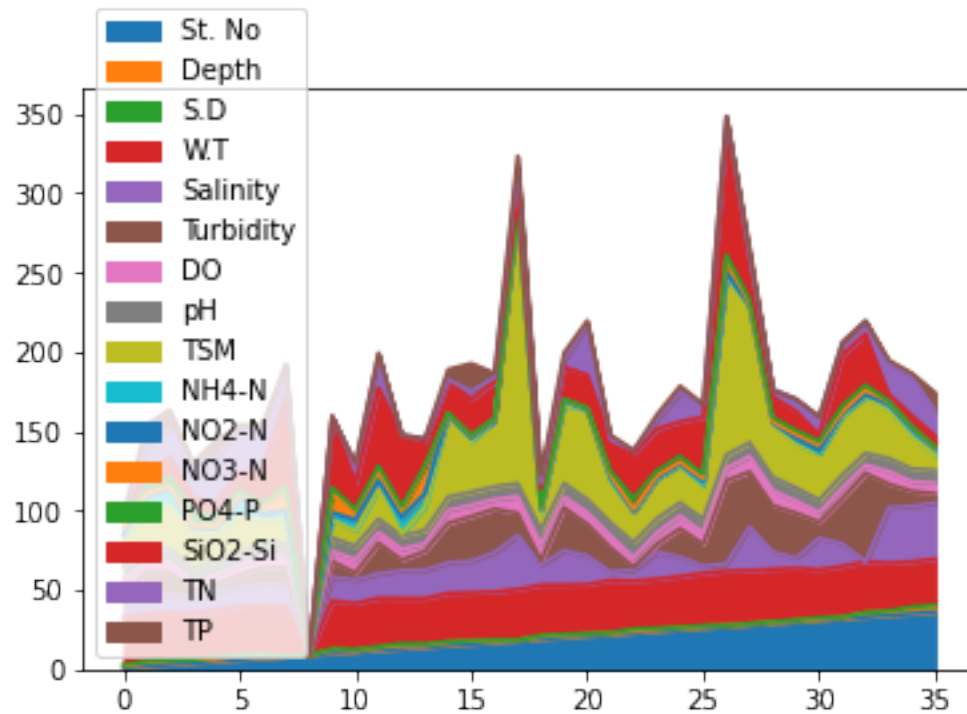
```
[9]: WQData.plot(x='St. No',y='DO',ylabel='DO')
```

```
[9]: <AxesSubplot:xlabel='St. No', ylabel='DO'>
```

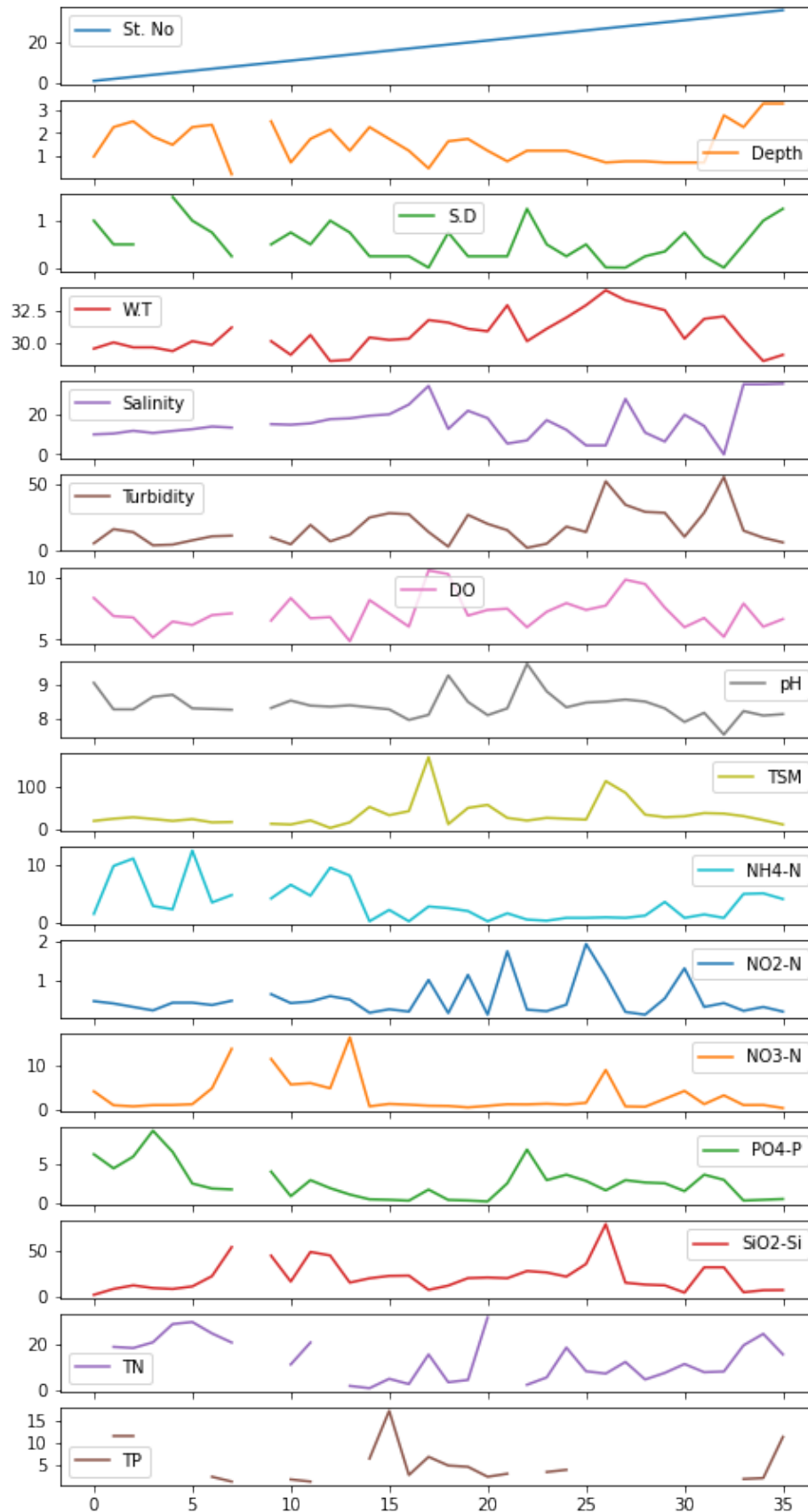


```
[10]: WQData.plot.area()
```

```
[10]: <AxesSubplot:>
```

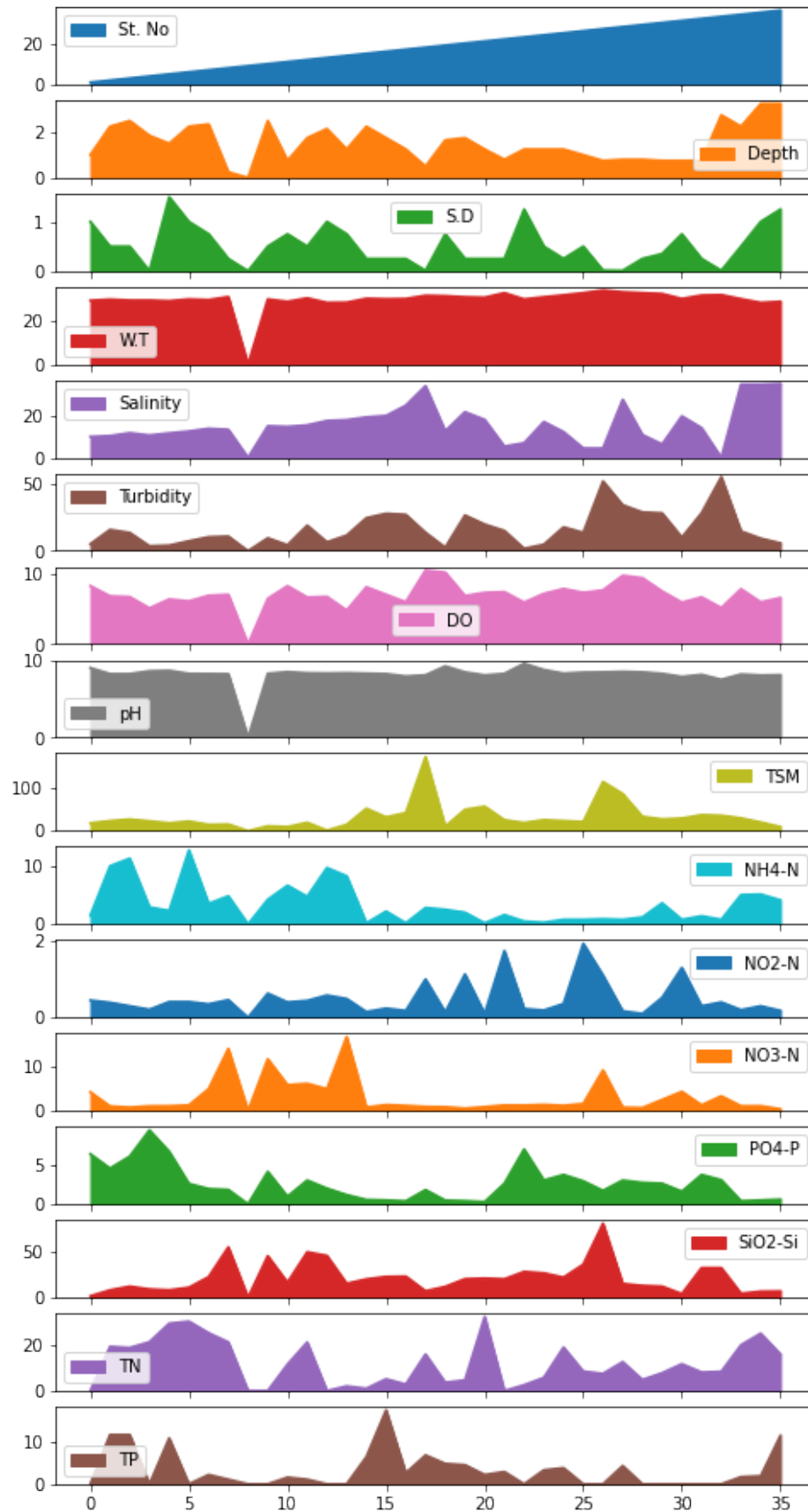


```
[11]: axs=WQData.plot(figsize=(8,16),subplots=True)
```



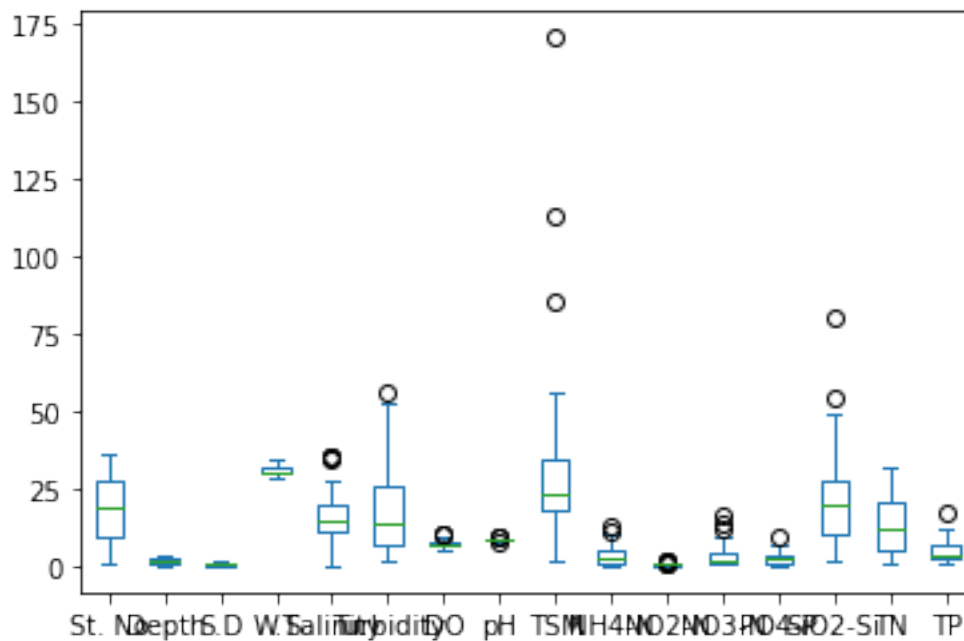
```
[12]: axs=WQData.plot.area(figsize=(8,16),subplots=True)
```





```
[13]: WQData.plot.box()
```

```
[13]: <AxesSubplot:>
```



```
[14]: xl = pd.ExcelFile('WQ.xlsx')
```

```
[19]: names = xl.sheet_names
print(names)
```

```
['May 04', 'June 04', 'July 04', 'Aug 04', 'Sep 04', 'Oct 04', 'Nov 04', 'Dec 04', 'Jan 05', 'Feb 05', 'Mar 05', 'Apr 05', 'May 05', 'June 05', 'July 05', 'Aug 05', 'Sep 05', 'Oct 05', 'Nov 05', 'Dec 05', 'Jan 06', 'Feb 06', 'Mar 06', 'Apr 06', 'May 06', 'June 06', 'July 06', 'Aug 06', 'Sep 06']
```

```
[16]: names[2]
```

```
[16]: 'July 04'
```

```
[17]: Data = pd.read_excel('WQ.xlsx', sheet_name=names[2])
```

```
[18]: Data
```

```
[18]:
```

	St. No	Depth	S.D	W.T	Salinity	Turbidity	DO	pH	TSM \
0	1	0.20	0.20	30.7	23.2	29.70	7.90	8.63	56.46

1	2	2.30	0.00	30.6	22.2	108.00	6.60	8.14	159.80
2	3	2.50	0.15	30.7	23.7	97.80	9.10	8.16	116.03
3	4	2.25	1.00	30.3	22.5	7.25	9.30	8.30	26.70
4	5	1.60	1.50	30.4	22.3	4.90	7.40	8.39	18.90
5	6	3.00	0.50	31.0	23.8	19.80	6.10	8.19	42.09
6	7	2.80	0.75	30.2	23.4	15.00	6.93	8.07	80.00
7	8	0.75	0.75	30.5	21.3	1.02	7.41	8.45	80.60
8	9	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
9	10	3.00	1.00	30.7	23.4	6.89	5.64	8.16	62.28
10	11	0.35	0.35	29.7	22.1	3.39	6.45	8.40	43.68
11	12	2.35	0.50	29.8	23.3	16.80	6.77	8.17	50.60
12	13	2.35	0.35	30.4	23.4	7.55	7.25	8.23	57.08
13	14	0.75	0.75	29.7	20.1	8.58	5.48	8.02	65.16
14	15	2.30	0.15	30.2	23.2	155.00	6.40	8.19	170.40
15	16	2.00	0.00	30.0	22.9	202.00	5.20	8.25	306.80
16	17	1.00	0.00	30.5	20.0	408.00	3.50	8.24	313.10
17	18	0.85	0.15	29.5	19.0	70.80	9.60	8.05	104.20
18	19	2.00	0.50	31.6	22.9	26.60	6.40	8.26	54.40
19	20	1.75	0.00	30.8	22.3	276.00	6.70	8.04	400.40
20	21	1.25	0.00	30.0	22.7	289.00	6.40	8.08	370.80
21	22	1.25	0.50	30.2	20.0	12.80	10.40	8.18	22.10
22	23	1.25	1.25	30.4	20.0	9.30	3.30	8.56	20.80
23	24	1.25	0.15	30.2	20.9	81.30	4.60	8.01	100.66
24	25	1.50	0.10	30.4	17.0	193.00	6.90	7.95	233.90
25	26	1.50	0.10	30.3	14.4	230.00	7.40	7.90	277.40
26	27	0.75	0.00	31.5	14.0	336.00	6.10	8.03	451.90
27	28	1.00	0.15	30.9	16.9	95.50	5.30	8.17	178.52
28	29	1.00	0.10	30.5	15.8	77.00	6.10	8.20	107.88
29	30	1.25	0.00	30.5	15.0	311.00	5.90	8.13	1139.16
30	31	0.75	0.15	30.7	11.0	78.50	7.50	8.15	123.40
31	32	0.75	0.10	31.0	13.0	62.80	5.60	8.39	76.48
32	33	3.00	0.10	30.7	0.0	71.70	3.20	7.68	66.20
33	34	NaN	0.25	28.5	20.1	21.30	7.70	7.94	38.58
34	35	1.00	0.10	28.5	21.0	66.00	3.50	8.15	121.60
35	36	2.25	0.10	28.9	22.7	83.20	4.00	8.14	126.76

	NH4-N	NO2-N	NO3-N	P04-P	Si02-Si	TN	TP
0	4.2300	0.3262	2.4377	1.0164	19.43556	29.12455	3.9872
1	3.6900	0.3728	0.8593	0.8316	11.69612	22.22220	3.6736
2	5.4900	0.3029	1.5286	0.3234	13.69620	20.20200	3.2704
3	0.9450	0.6524	1.3789	0.5082	15.65280	30.80805	4.0768
4	0.1800	0.4427	1.9216	0.6468	10.95696	35.85855	3.2256
5	2.2500	0.5126	1.4188	0.5544	6.17416	32.49155	3.4944
6	12.0480	0.1135	10.5345	1.3795	8.90820	38.06000	NaN
7	11.7120	0.1589	18.8051	1.8245	20.31615	66.77800	NaN
8	NaN	NaN	NaN	NaN	NaN	NaN	NaN
9	9.4080	0.2270	9.1890	0.9790	7.54470	34.94600	NaN

10	21.2160	0.1135	10.0945	0.1335	13.45320	71.62200	NaN
11	11.7120	0.1816	8.1344	0.4005	11.18070	55.70600	NaN
12	7.5360	0.0908	2.1092	0.5785	12.68055	55.70600	NaN
13	9.3600	0.1816	7.5624	2.5365	4.95405	38.40600	NaN
14	5.9438	0.4060	2.8250	0.8910	14.29560	38.06000	1.4384
15	0.2104	0.7511	2.3722	0.8415	22.99000	48.95900	1.2760
16	1.2624	0.8729	1.3888	1.1880	17.72320	32.69700	2.8884
17	2.1120	2.3205	9.6378	0.1133	27.08550	49.61000	0.3496
18	0.3156	0.5887	1.9602	0.5940	10.65900	23.18200	0.3480
19	0.1578	0.3045	2.0649	0.6435	8.86160	9.51500	0.8352
20	0.4320	2.6593	18.3617	0.6144	18.73740	6.81800	NaN
21	3.5520	1.9110	5.1711	0.0103	22.87220	52.48000	0.3496
22	5.5200	0.0203	1.7287	0.3456	9.70530	9.89000	NaN
23	6.3360	0.0609	1.7871	0.2784	6.67590	12.17500	1.3300
24	1.9200	1.5225	4.9125	0.5952	14.36160	51.86550	9.9700
25	3.3120	1.1165	6.9355	0.7104	14.92260	13.14900	10.3200
26	NaN	2.0800	7.6370	0.2548	28.70000	26.56250	5.3700
27	2.6880	0.1015	1.9115	0.4320	8.58330	19.67000	1.2700
28	2.7360	0.0406	1.6094	0.4224	8.80770	20.26000	1.5600
29	NaN	0.5800	2.7410	0.1176	25.86500	12.53750	1.9800
30	NaN	1.5200	2.3340	0.1176	20.12000	9.35000	5.9600
31	NaN	0.3400	3.6370	0.2058	19.77000	30.38750	2.9400
32	NaN	1.5800	22.2410	0.5586	16.10000	45.26250	13.4400
33	5.0400	1.4430	1.9239	0.0721	22.82590	37.31000	0.3772
34	NaN	2.2815	3.8718	0.1030	23.05740	42.23000	0.3496
35	NaN	2.5545	5.0694	0.1339	23.42780	51.25000	0.4416

[ ]: