

Results manual clustering

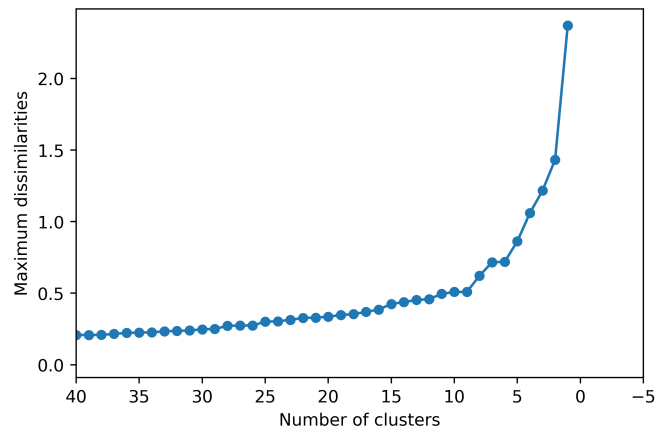
Wangyang Ye

June 27, 2019

Data source: BOAT data - all ribs
Type of Clustering: Time series clustering
Chosen hours: from 1 to 10
Chosen days: from 21/07/2018 to 15/09/2018
The coordinates chosen are: []
The date filters chosen are: ['20180721', '20180722', '20180723', '20180724', '20180807', '20180808', '20180810', '20180905']
Dataset has 92 elements
Elapsed time to normalize data with space average speed was: 0.127 s

1 Manual clustering infos

Generation of complete dendrogram:
The hierarchical clustering algorithm execution time was 0.000 s



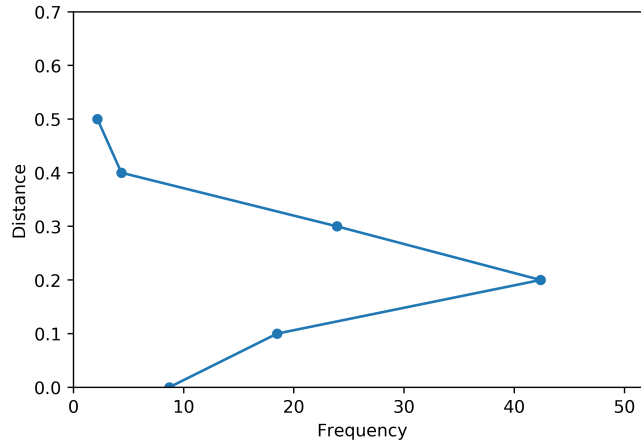
Hierarchical clustering for k values chosen:
The hierarchical clustering algorithm execution time was 100.044 s

2 K-means infos

The chosen k are: [6]

3 Manual clustering results, k = 6

3.1 Threshold



The threshold chosen is: 0.50

Execution time of k-means: 1358.297 s
 Number of iterations in k-means: 3
 Elements that have changed cluster: 7
 Number of outliers with distance greater than threshold: 1
 Number of outliers with their own cluster: 0

Number of clusters: 6
 Percentage of boats of same day in same cluster: 86.34%

Table 1: Averages of meteorological parameters (1)

| Cluster | TWS | TWD | Pressure | Temp. | Temp. at ground | Humidity | Precipitation |
|---------|-------|--------|----------|-------|-----------------|----------|---------------|
| 1 | 8.74 | 199.25 | 1008.44 | 28.07 | 28.98 | 84.03 | 0.86 |
| 2 | 9.06 | 69.03 | 1014.68 | 25.91 | 27.44 | 69.69 | 1.02 |
| 3 | 13.46 | 209.97 | 1010.33 | 27.63 | 27.93 | 83.49 | 0.00 |
| 4 | 5.71 | 147.19 | 1010.24 | 27.81 | 28.48 | 83.08 | 0.06 |
| 5 | 8.07 | 28.28 | 1014.62 | 24.21 | 26.15 | 78.68 | 4.04 |
| 6 | 2.98 | 316.53 | 1012.24 | 26.90 | 27.93 | 79.55 | 0.41 |
| ***7*** | 5.27 | 327.25 | 1009.93 | 28.44 | 28.44 | 80.52 | 0.00 |

Table 2: Averages of meteorological parameters (2)

| Cluster | Low cloud coverage | Medium cc. | High cc. | Total cc. | Gust | Land cover surface |
|---------|--------------------|------------|----------|-----------|-------|--------------------|
| 1 | 0.41 | 2.31 | 6.33 | 7.52 | 11.93 | 0.12 |
| 2 | 14.15 | 4.24 | 10.85 | 24.40 | 12.62 | 0.12 |
| 3 | 0.00 | 2.70 | 9.89 | 14.59 | 24.13 | 0.12 |
| 4 | 0.49 | 0.14 | 10.51 | 10.93 | 12.51 | 0.12 |
| 5 | 52.11 | 24.44 | 27.71 | 75.55 | 13.16 | 0.12 |
| 6 | 2.50 | 2.17 | 18.36 | 19.63 | 16.77 | 0.12 |
| ***7*** | 0.00 | 0.00 | 2.44 | 2.44 | 21.50 | 0.12 |

| Cluster | N° elements | Relative freq | Min temp | Avg temp | Max temp | Min humid. | Avg humid. | Max humid. |
|---------|-------------|---------------|----------|----------|----------|------------|------------|------------|
| 1 | 38 | 41.30 | 26.67 | 28.07 | 29.36 | 75.63 | 84.03 | 92.00 |
| 2 | 22 | 23.91 | 22.70 | 25.91 | 27.98 | 59.70 | 69.69 | 85.79 |
| 3 | 15 | 16.30 | 26.62 | 27.63 | 28.65 | 75.63 | 83.49 | 89.66 |
| 4 | 9 | 9.78 | 26.16 | 27.81 | 29.19 | 77.61 | 83.08 | 87.60 |
| 5 | 4 | 4.35 | 22.57 | 24.21 | 25.49 | 69.75 | 78.68 | 90.29 |
| 6 | 3 | 3.26 | 25.05 | 26.90 | 28.46 | 69.75 | 79.55 | 86.66 |
| ***7*** | 1 | 1.09 | 28.19 | 28.44 | 28.63 | 79.97 | 80.52 | 81.24 |

| Cluster | Min speed | Avg speed | Max speed | Min direction | Avg direction | Max direction |
|---------|-----------|-----------|-----------|---------------|---------------|---------------|
| 1 | 5.060 | 8.745 | 10.547 | 189.769 | 199.250 | 216.750 |
| 2 | 7.340 | 9.055 | 10.900 | 52.012 | 69.028 | 110.000 |
| 3 | 5.894 | 13.457 | 18.132 | 193.299 | 209.975 | 233.280 |
| 4 | 3.833 | 5.713 | 8.296 | 101.157 | 147.194 | 198.695 |
| 5 | 5.400 | 8.070 | 9.811 | 4.476 | 28.278 | 356.918 |
| 6 | 1.567 | 2.976 | 5.653 | 4.960 | 316.530 | 356.478 |
| ***7*** | 0.821 | 5.266 | 10.215 | 35.954 | 327.253 | 341.861 |

| Cluster | Min precipit. | Avg precipit. | Max Precipit. | Min pressure | Avg pressure | Max pressure |
|---------|---------------|---------------|---------------|--------------|--------------|--------------|
| 1 | 0.000 | 0.864 | 10.633 | 1003.066 | 1008.443 | 1013.782 |
| 2 | 0.003 | 1.016 | 5.772 | 1006.545 | 1014.683 | 1023.591 |
| 3 | 0.000 | 0.001 | 0.003 | 1005.021 | 1010.333 | 1013.520 |
| 4 | 0.000 | 0.064 | 0.236 | 1008.113 | 1010.239 | 1012.818 |
| 5 | 1.148 | 4.043 | 6.897 | 1012.983 | 1014.620 | 1016.548 |
| 6 | 0.000 | 0.407 | 1.251 | 1010.479 | 1012.236 | 1013.540 |
| ***7*** | 0.000 | 0.000 | 0.000 | 1009.240 | 1009.931 | 1010.509 |

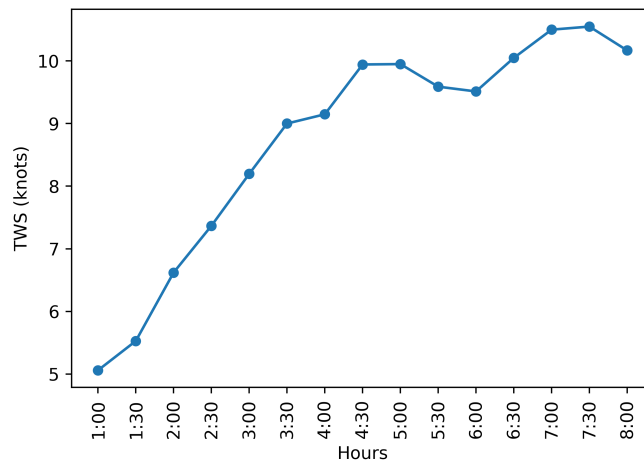
| Cluster | Min Temp. Ground | Avg TG | Max TG | Min TCC | Avg TCC | Max TCC |
|---------|------------------|--------|--------|---------|---------|---------|
| 1 | 26.415 | 28.980 | 30.311 | 0.000 | 7.523 | 84.011 |
| 2 | 25.361 | 27.445 | 29.333 | 0.000 | 24.395 | 73.392 |
| 3 | 26.890 | 27.929 | 29.572 | 0.000 | 14.587 | 71.663 |
| 4 | 26.299 | 28.480 | 30.097 | 0.000 | 10.930 | 84.011 |
| 5 | 24.680 | 26.147 | 27.601 | 26.185 | 75.549 | 97.698 |
| 6 | 27.104 | 27.932 | 28.764 | 0.000 | 19.626 | 66.066 |
| ***7*** | 28.264 | 28.439 | 28.533 | 0.890 | 2.436 | 5.884 |

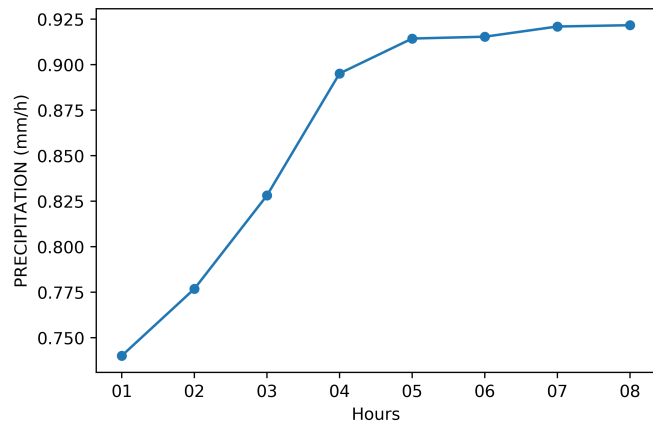
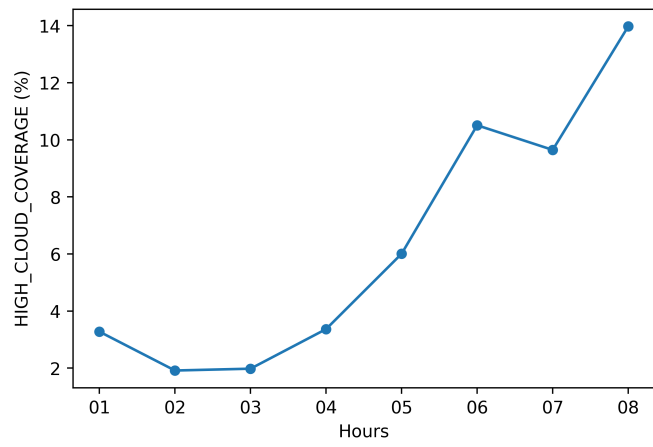
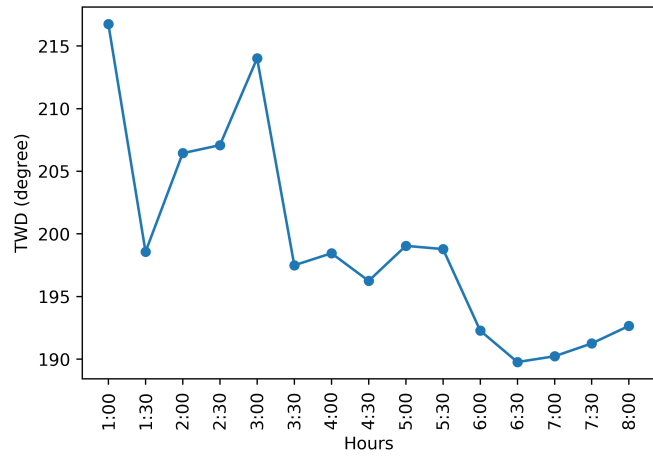
| Cluster | Min MCC | Avg MCC | Max MCC | Min HCC | Avg HCC | Max HCC | Min LCC | Avg LCC | Max LCC |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 0.000 | 2.315 | 77.238 | 0.000 | 6.335 | 84.011 | 0.000 | 0.411 | 5.661 |
| 2 | 0.000 | 4.239 | 73.374 | 0.000 | 10.848 | 67.611 | 0.000 | 14.151 | 68.008 |
| 3 | 0.000 | 2.700 | 28.780 | 0.000 | 9.892 | 57.079 | 0.000 | 0.000 | 0.000 |
| 4 | 0.000 | 0.137 | 4.801 | 0.000 | 10.512 | 84.011 | 0.000 | 0.486 | 5.331 |
| 5 | 0.000 | 24.442 | 83.652 | 0.000 | 27.705 | 66.066 | 2.449 | 52.109 | 97.698 |
| 6 | 0.000 | 2.170 | 14.623 | 0.000 | 18.360 | 66.066 | 0.000 | 2.500 | 18.264 |
| ***7*** | 0.000 | 0.000 | 0.000 | 0.890 | 2.436 | 5.884 | 0.000 | 0.000 | 0.000 |

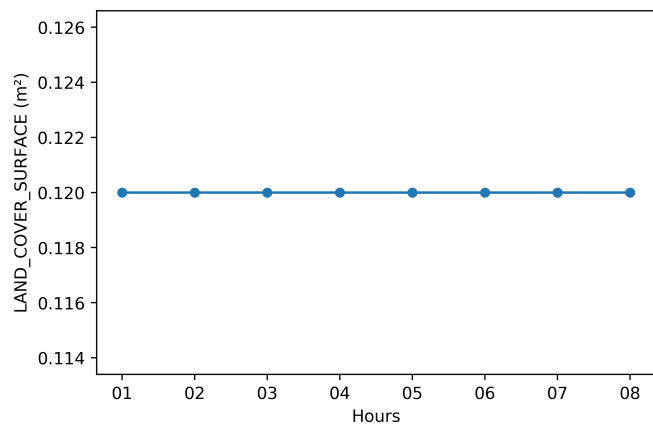
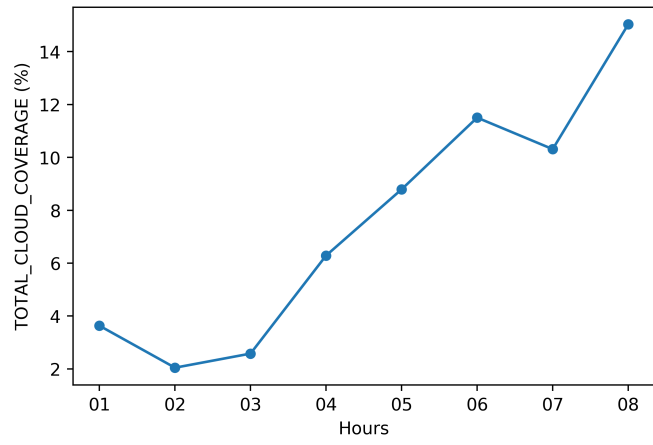
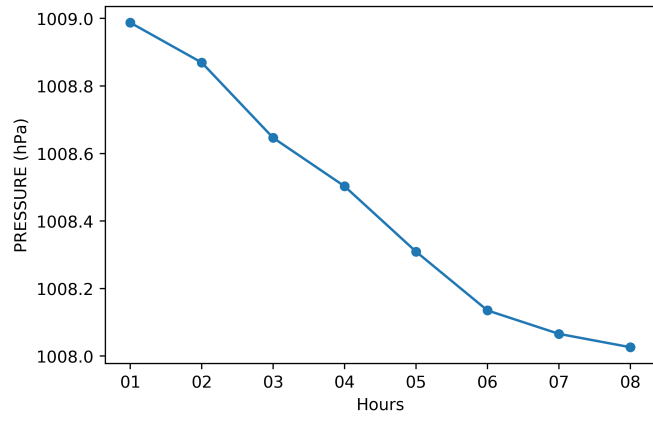
| Cluster | Min Gust | Avg Gust | Max Gust | Min LCS | Avg LCS | Max LCS |
|---------|----------|----------|----------|---------|---------|---------|
| 1 | 2.945 | 11.934 | 27.988 | 0.120 | 0.120 | 0.120 |
| 2 | 4.843 | 12.624 | 21.327 | 0.120 | 0.120 | 0.120 |
| 3 | 14.481 | 24.126 | 29.601 | 0.120 | 0.120 | 0.120 |
| 4 | 5.373 | 12.510 | 21.254 | 0.120 | 0.120 | 0.120 |
| 5 | 8.166 | 13.164 | 18.004 | 0.120 | 0.120 | 0.120 |
| 6 | 2.945 | 16.767 | 30.292 | 0.120 | 0.120 | 0.120 |
| ***7*** | 18.067 | 21.502 | 25.092 | 0.120 | 0.120 | 0.120 |

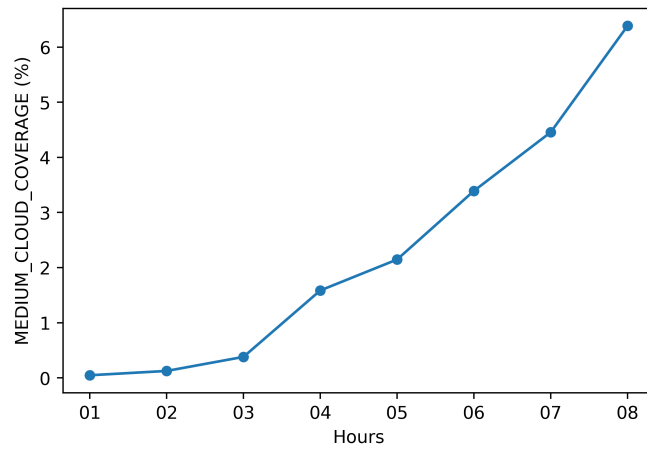
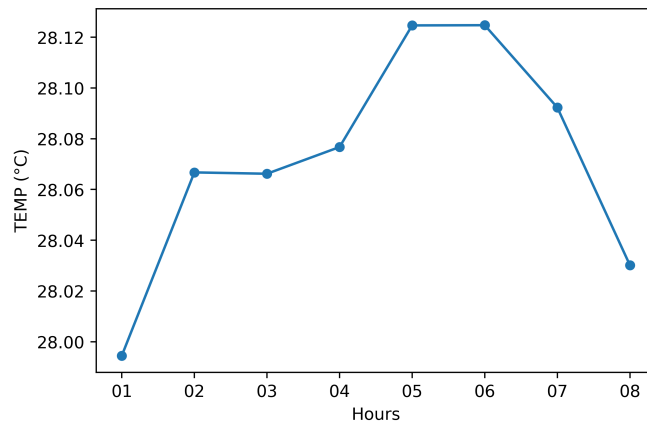
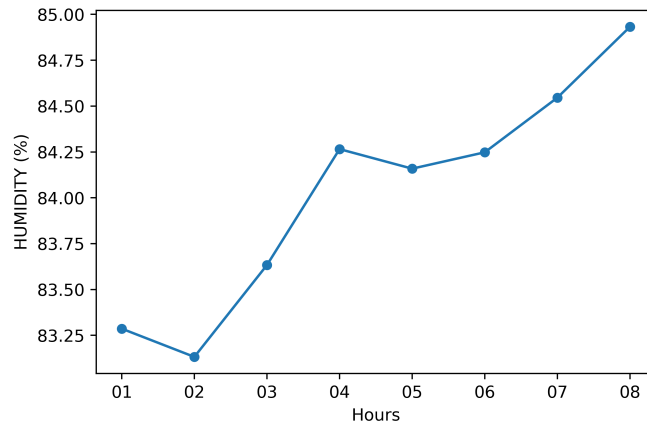
Cluster 1 with 38 elements:

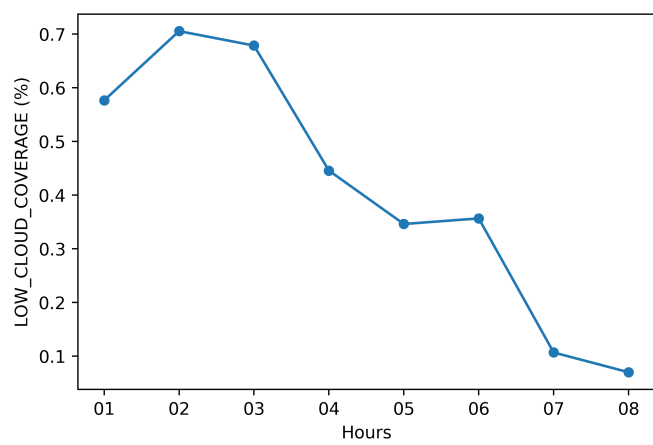
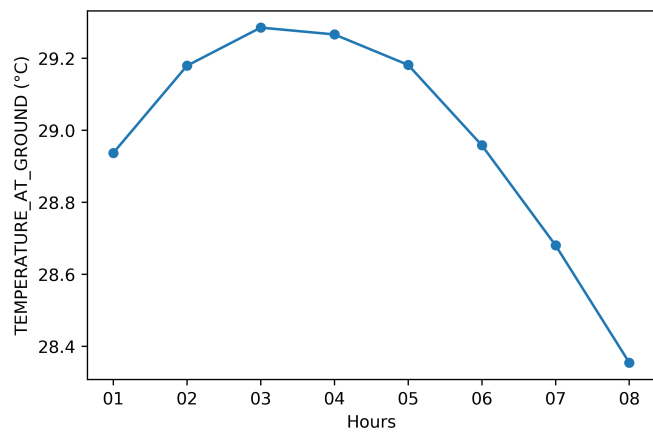
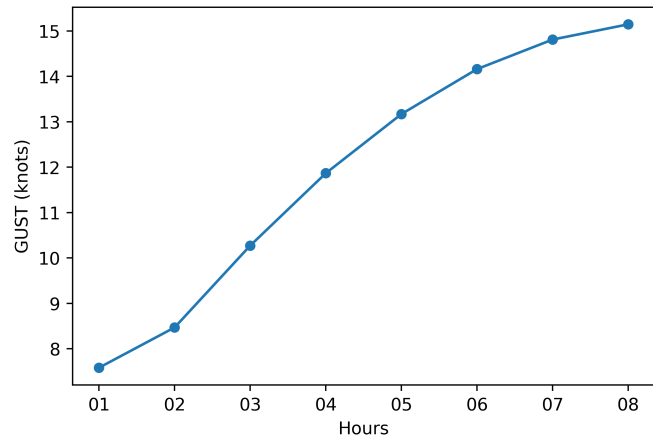
20180725 by boat 5m1
20180725 by boat 5m5
20180725 by boat 5m3
20180729 by boat 5m1
20180729 by boat 5m4
20180729 by boat 5m5
20180731 by boat 12
20180731 by boat 5m1
20180731 by boat 5m4
20180731 by boat 5m5
20180731 by boat 5m2
20180801 by boat 5m2
20180801 by boat 5m5
20180801 by boat 5m1
20180802 by boat 5m4
20180802 by boat 5m2
20180802 by boat 5m1
20180802 by boat 5m5
20180803 by boat 5m1
20180803 by boat 5m5
20180803 by boat 5m4
20180803 by boat 12
20180804 by boat 5m4
20180804 by boat 5m5
20180804 by boat 5m1
20180804 by boat 5m2
20180806 by boat 5m1
20180806 by boat 5m4
20180806 by boat 5m5
20180806 by boat 5m3
20180826 by boat 7
20180827 by boat 7
20180827 by boat 4
20180828 by boat 4
20180828 by boat 7
20180829 by boat 4
20180906 by boat 4
20180910 by boat 9





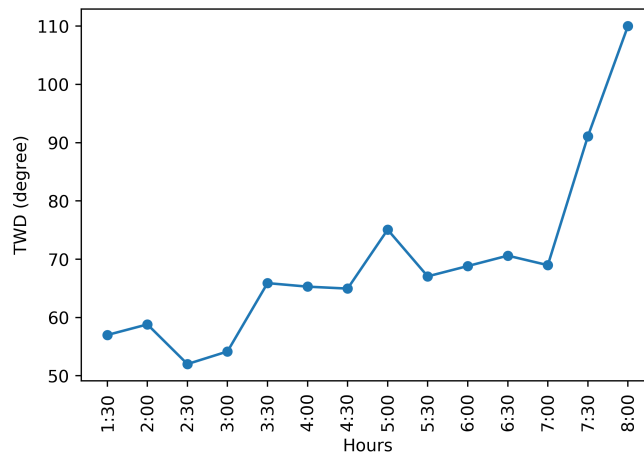
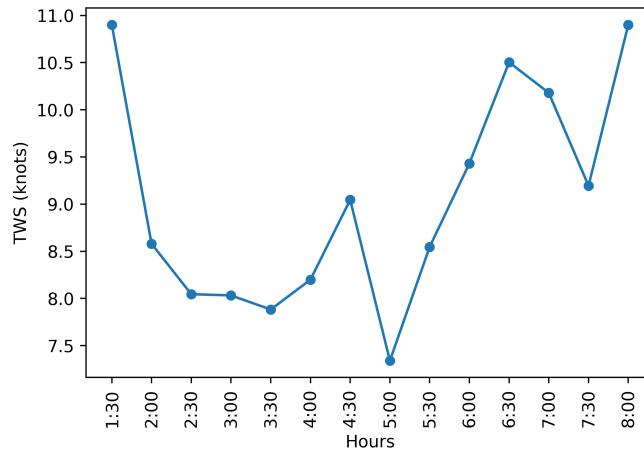


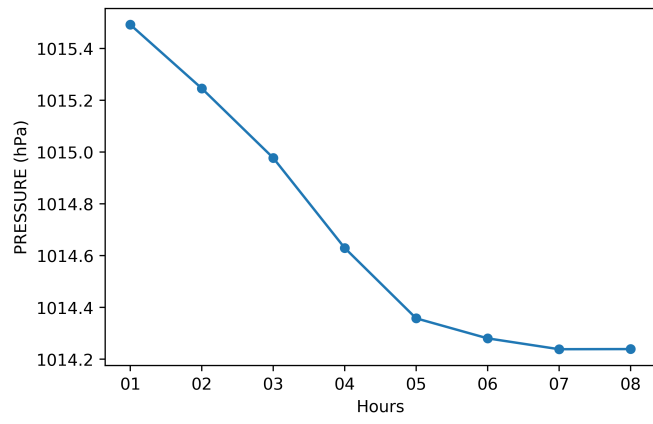
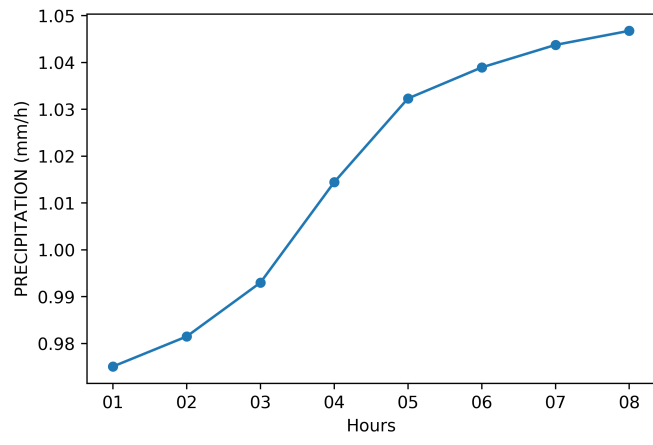
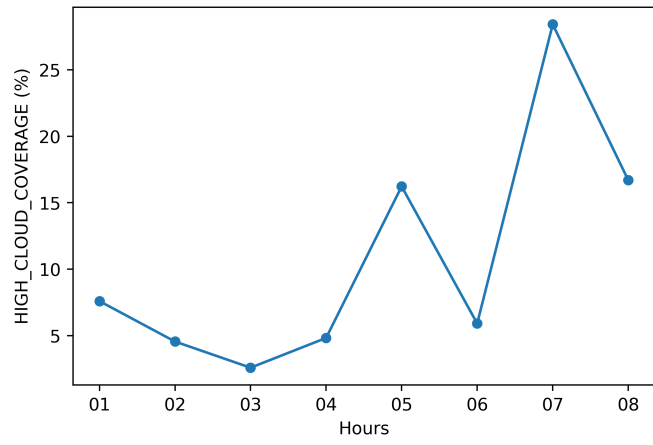


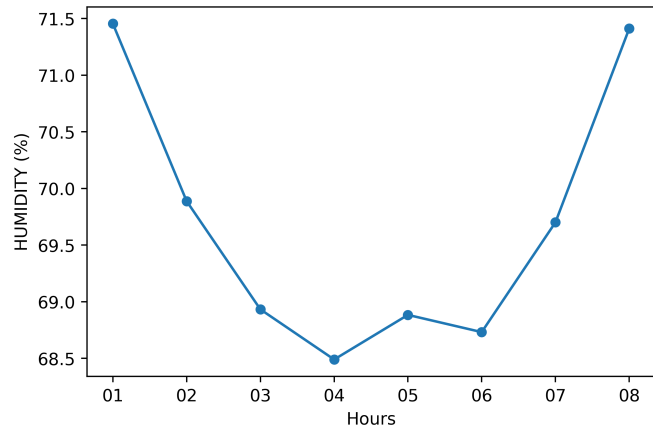
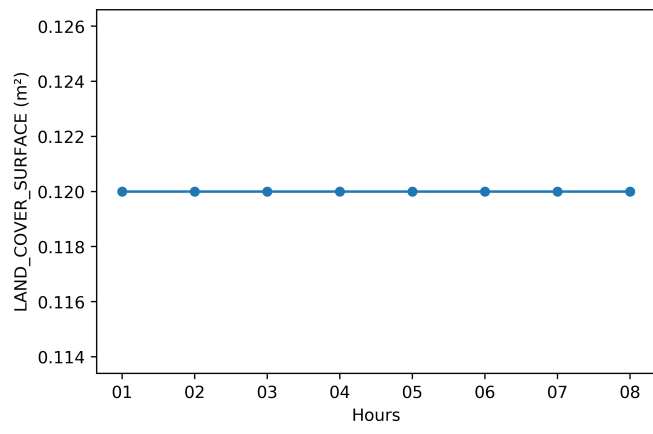
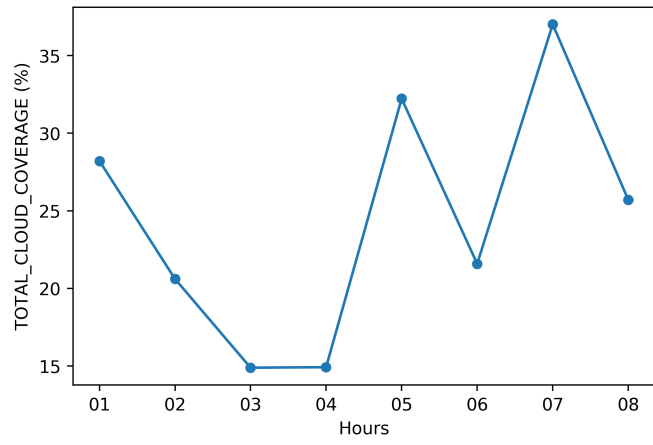


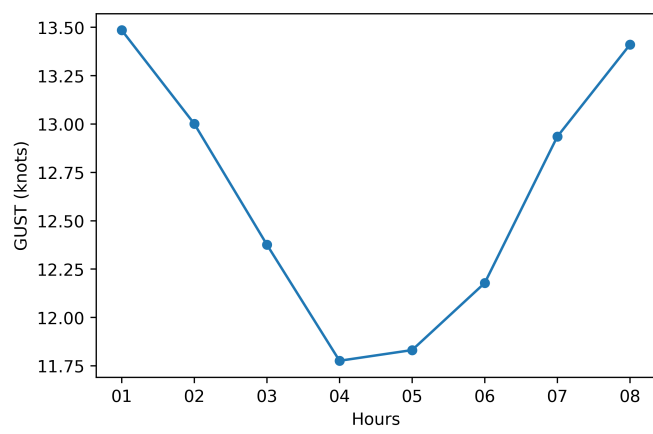
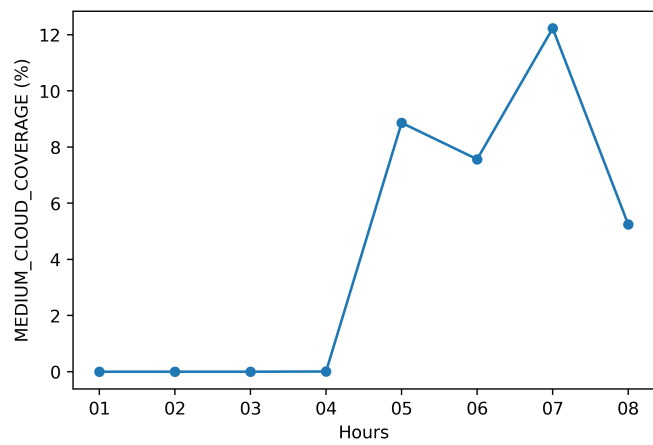
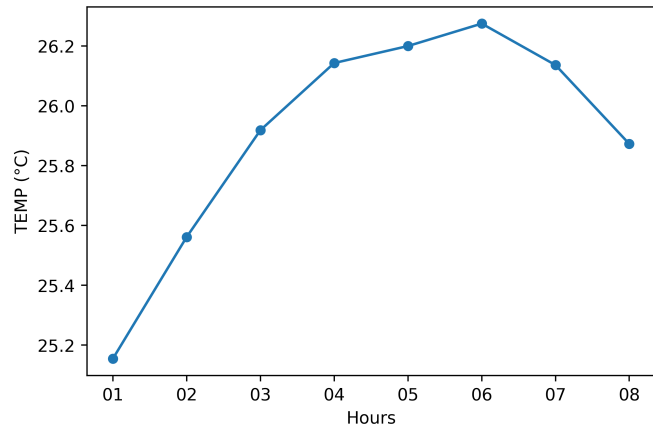
Cluster 2 with 22 elements:

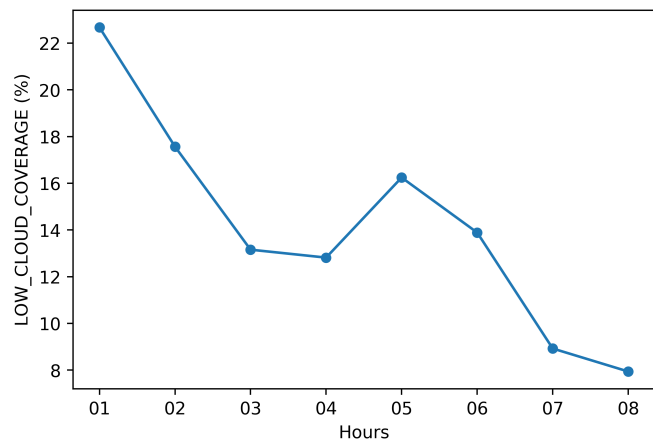
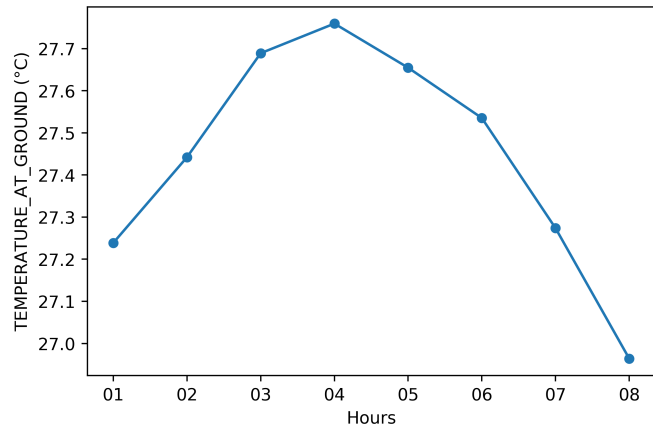
- 20180726 by boat 12
- 20180726 by boat 5m5
- 20180726 by boat 5m4
- 20180726 by boat 5m1
- 20180726 by boat 5m2
- 20180727 by boat 5m5
- 20180727 by boat 5m1
- 20180727 by boat 5m4
- 20180730 by boat 5m4
- 20180730 by boat 5m5
- 20180911 by boat 9
- 20180911 by boat 12
- 20180911 by boat 8
- 20180911 by boat 1
- 20180911 by boat 4
- 20180912 by boat 9
- 20180912 by boat 1
- 20180912 by boat 12
- 20180913 by boat 12
- 20180913 by boat 4
- 20180913 by boat 8
- 20180913 by boat 9





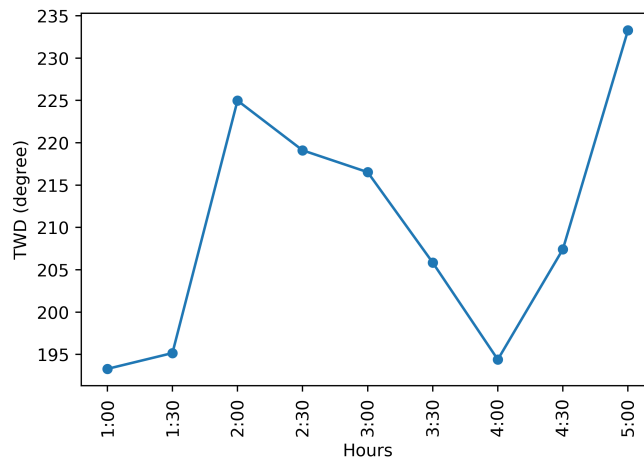
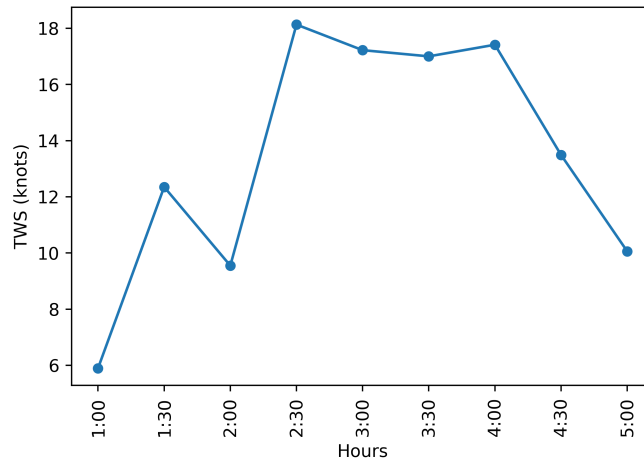


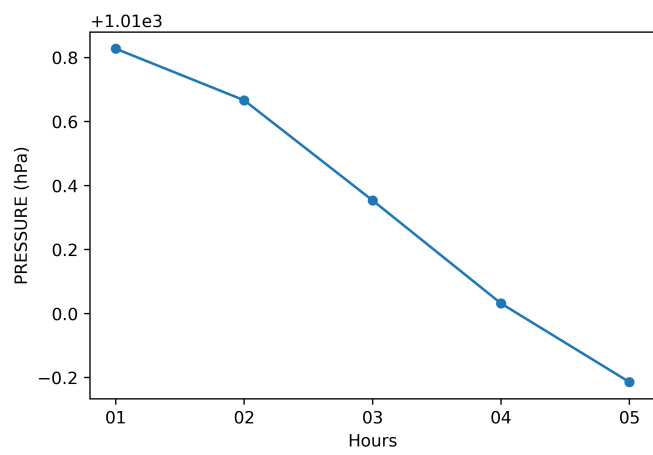
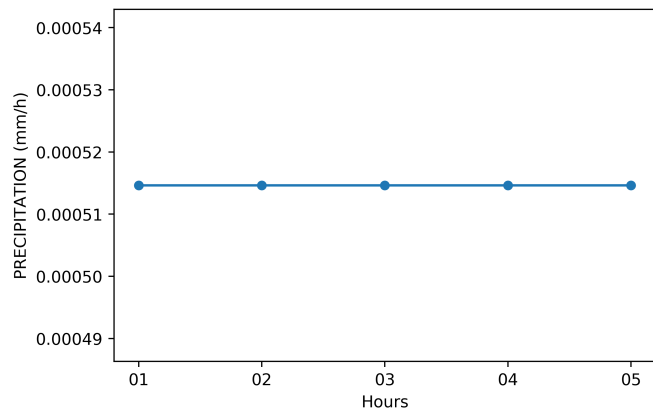
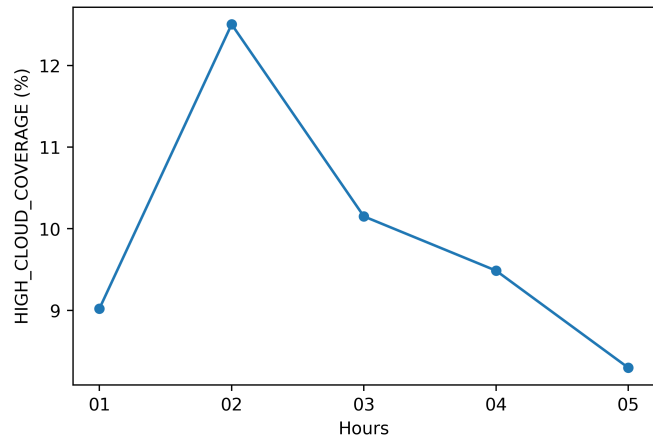


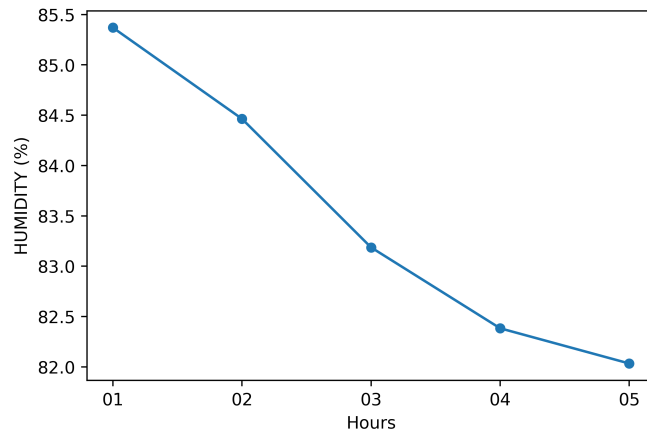
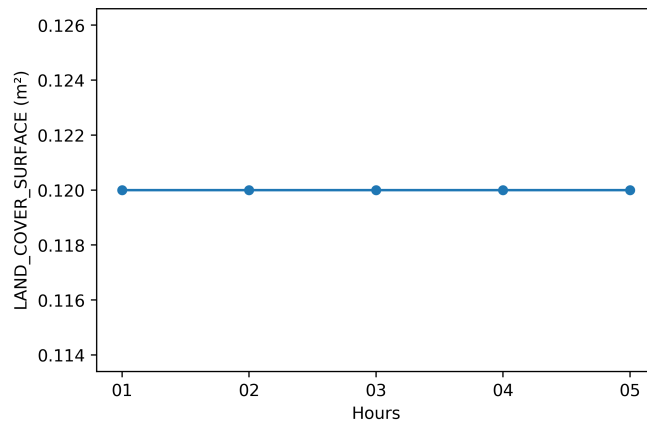
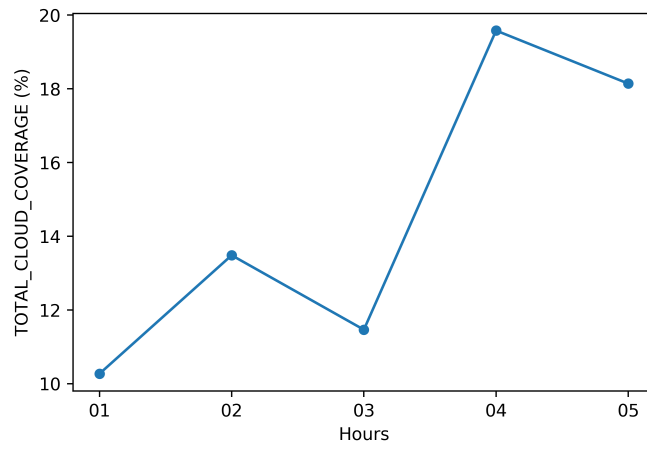


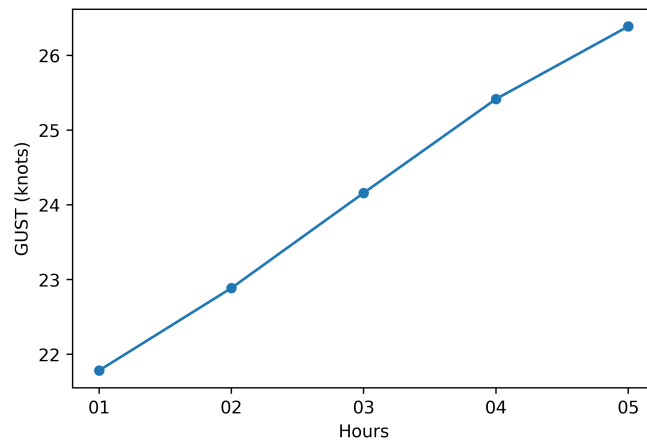
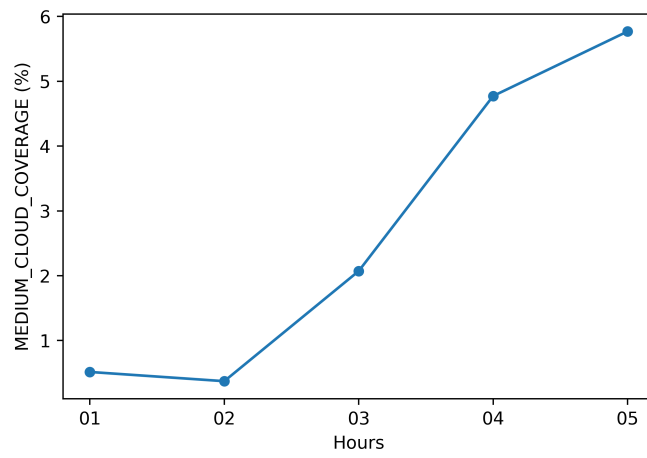
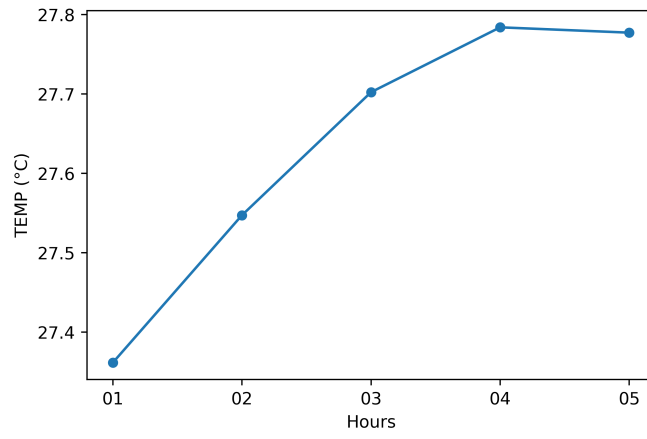
Cluster 3 with 15 elements:

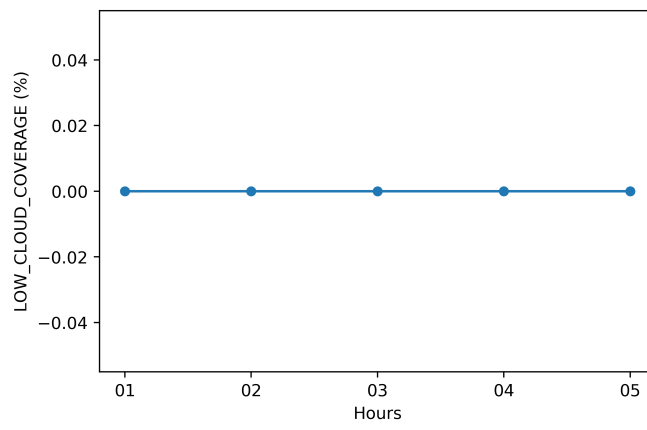
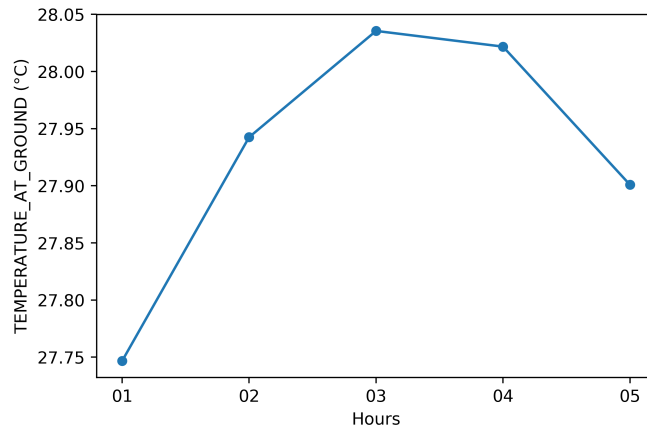
- 20180805 by boat 5m3
- 20180805 by boat 5m5
- 20180805 by boat 5m1
- 20180805 by boat 5m4
- 20180825 by boat 4
- 20180830 by boat 7
- 20180830 by boat 4
- 20180831 by boat 4
- 20180831 by boat 7
- 20180906 by boat 12
- 20180906 by boat 9
- 20180907 by boat 4
- 20180907 by boat 12
- 20180907 by boat 9
- 20180908 by boat 9





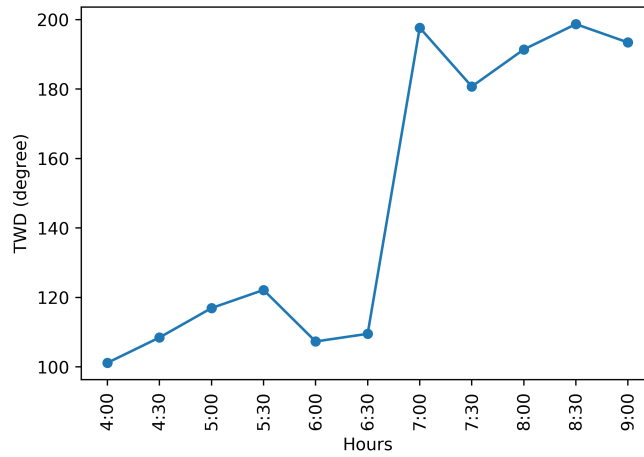
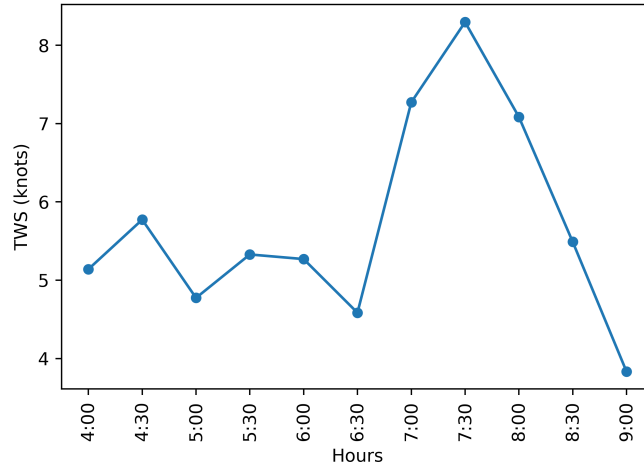


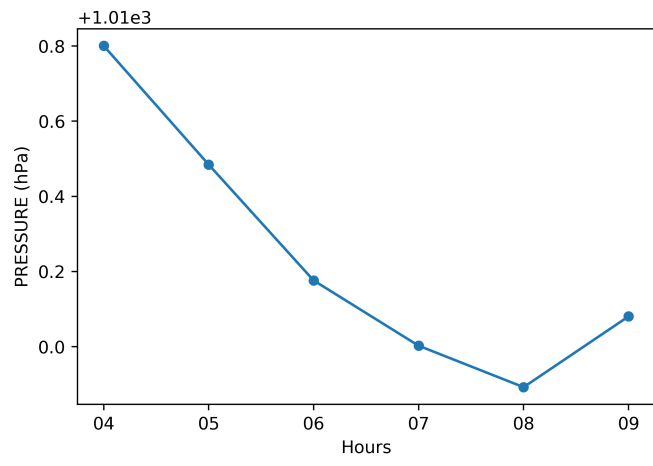
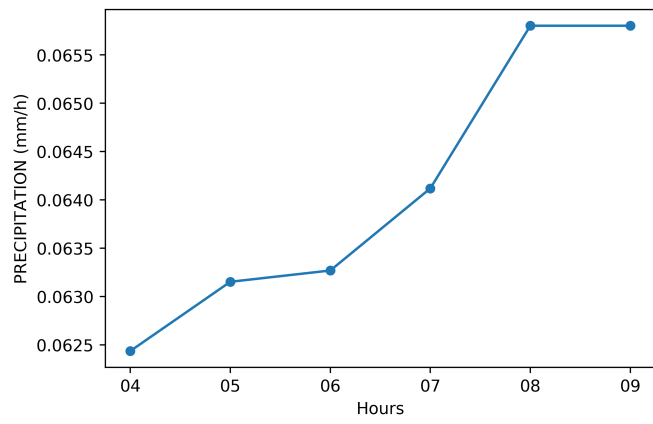
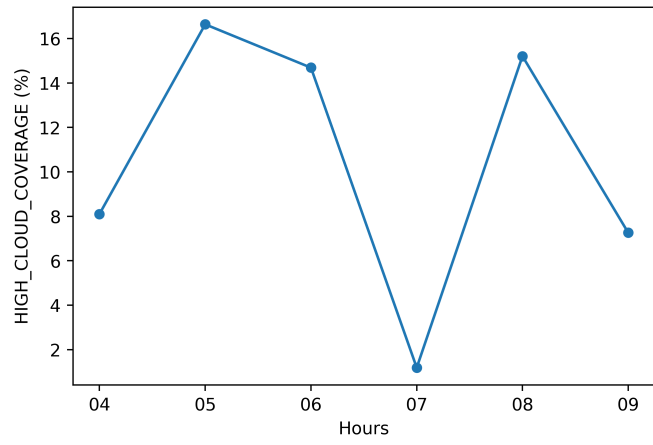


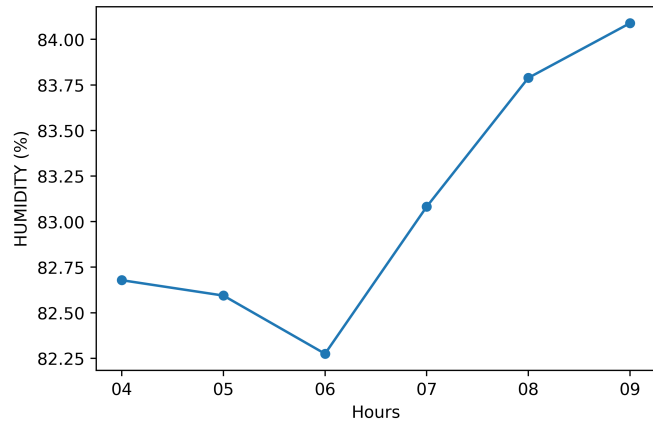
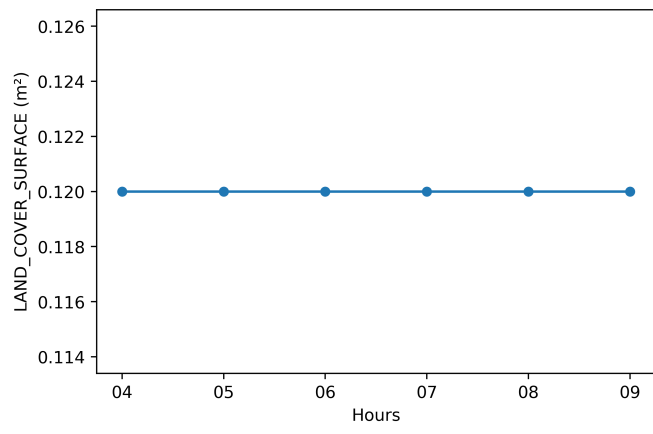
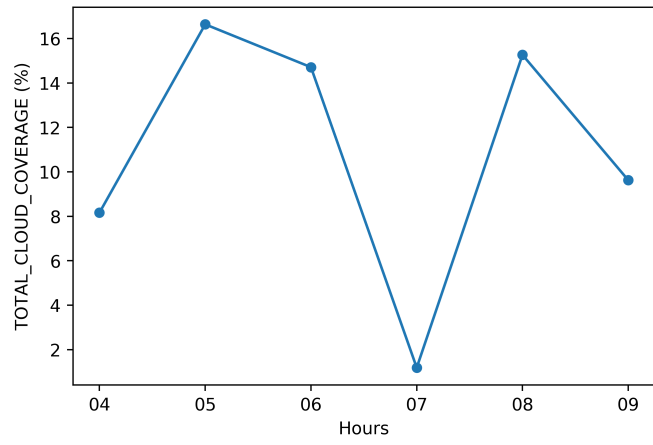


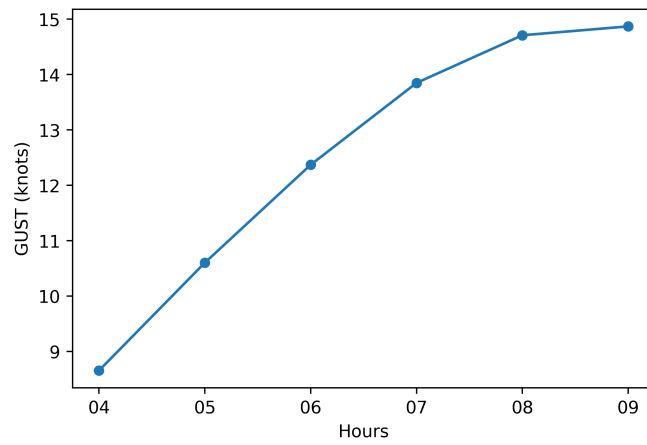
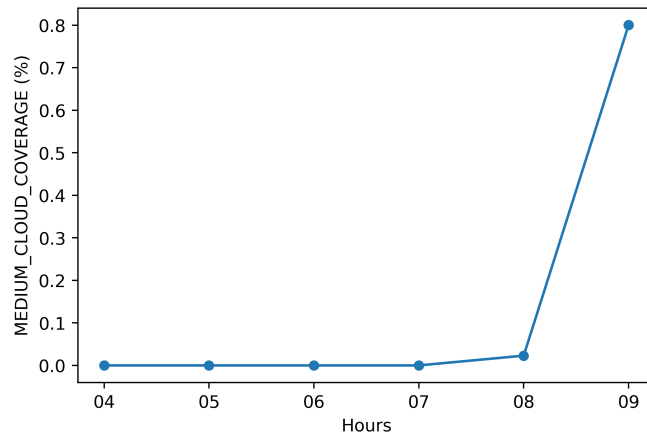
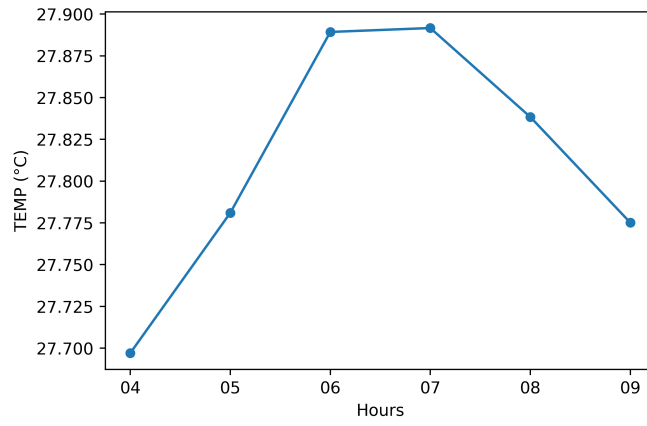
Cluster 4 with 9 elements:

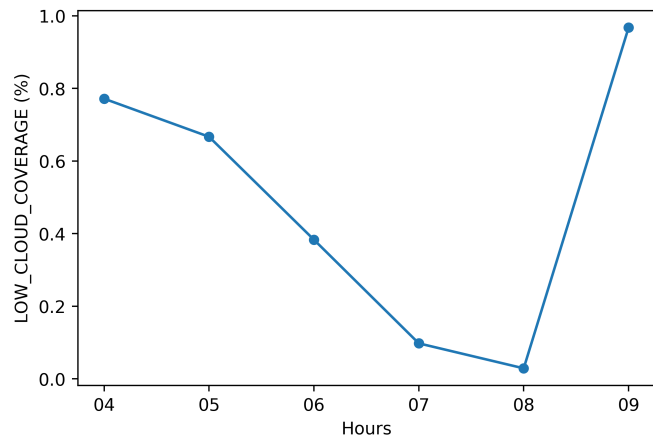
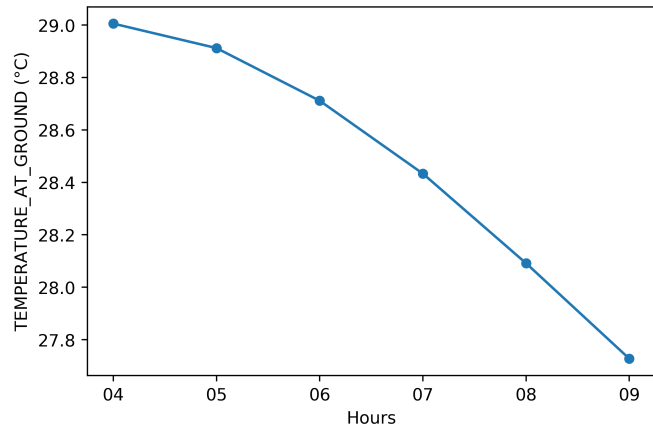
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- 20180725 by boat 5m4
- 20180730 by boat 12
- 20180730 by boat 5m2
- 20180730 by boat 5m1
- 20180826 by boat 4
- 20180828 by boat 9
- 20180829 by boat 7
- 20180903 by boat 4



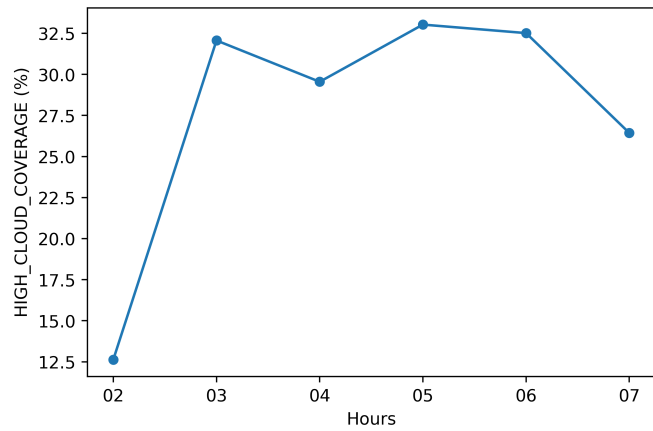
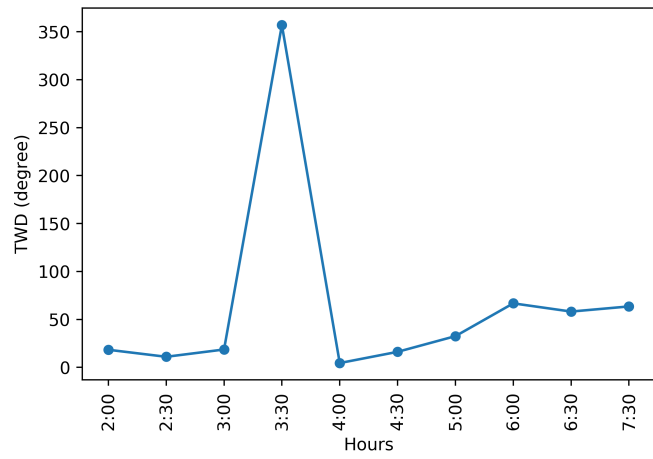
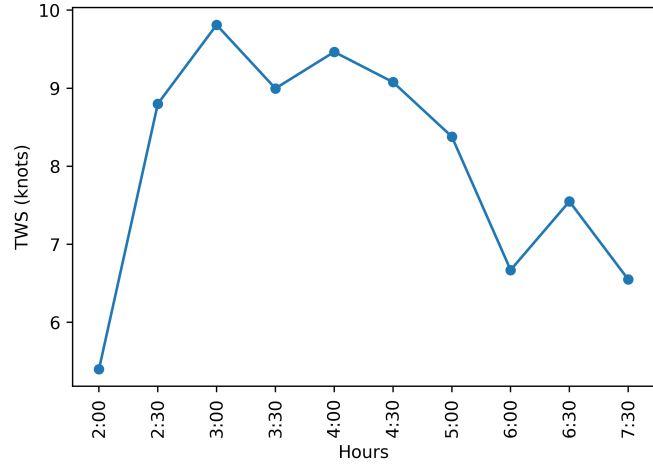


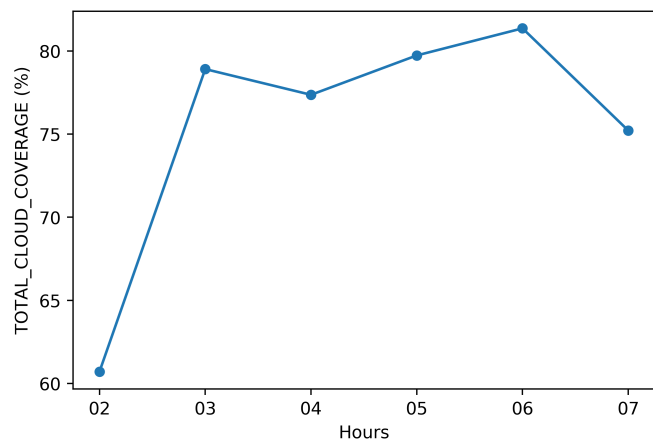
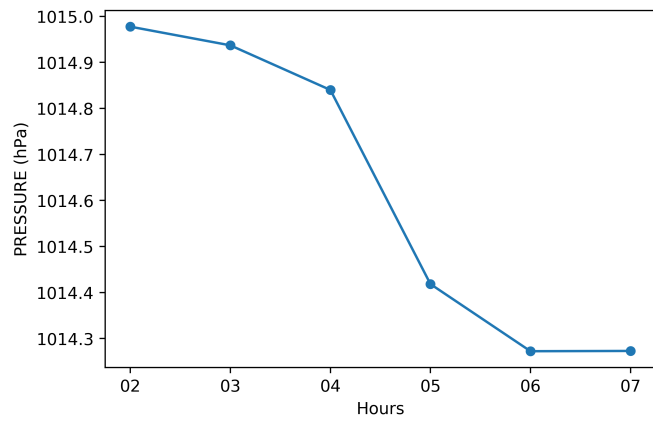
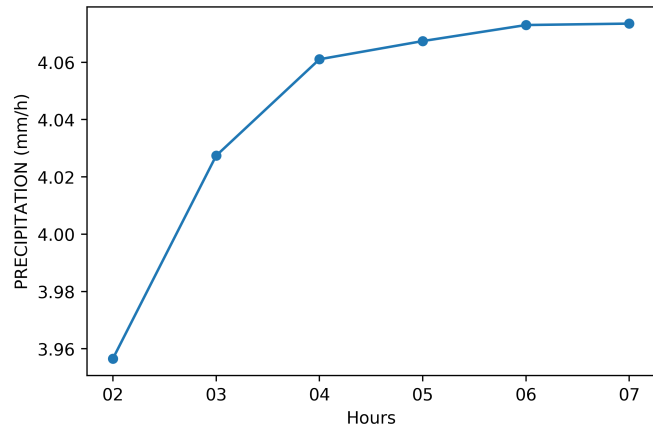


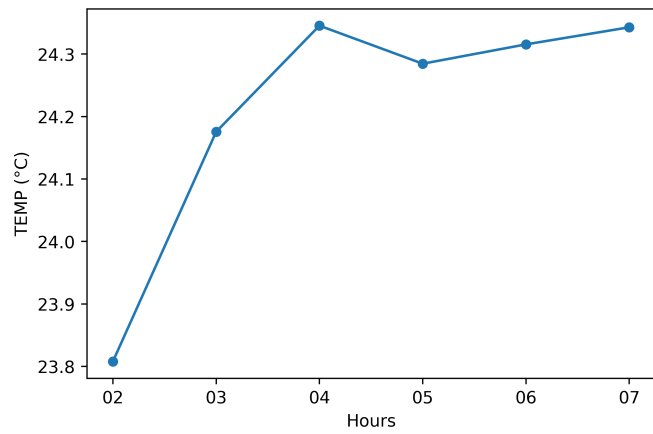
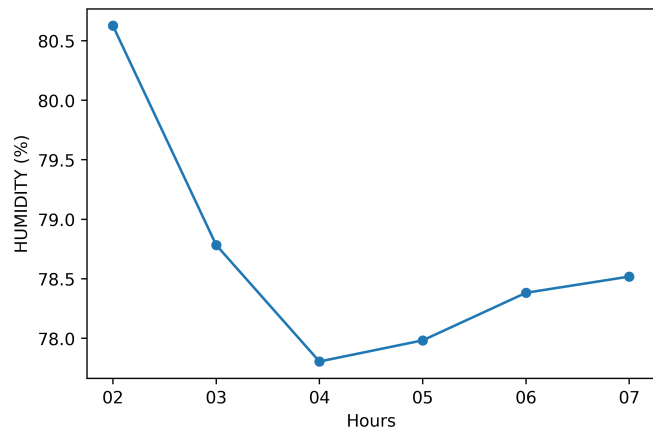
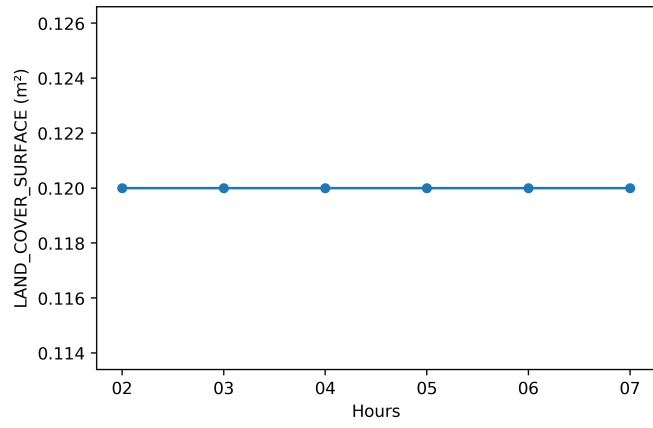


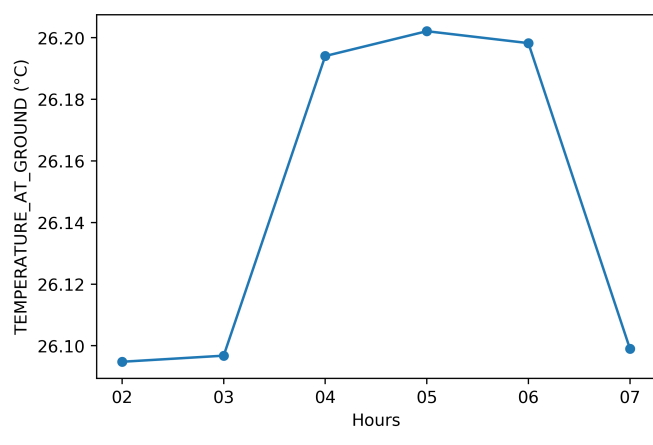
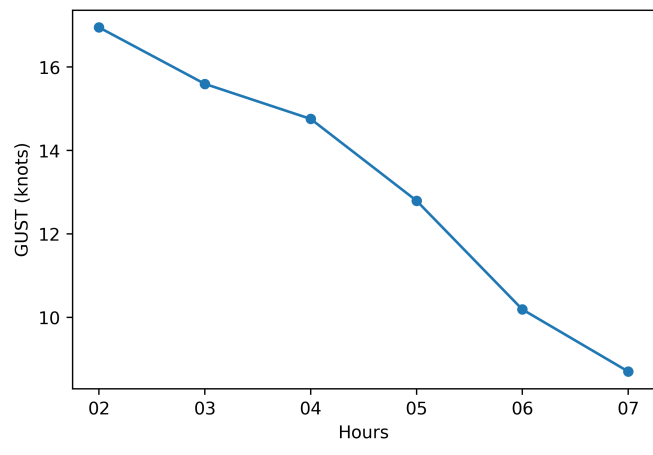
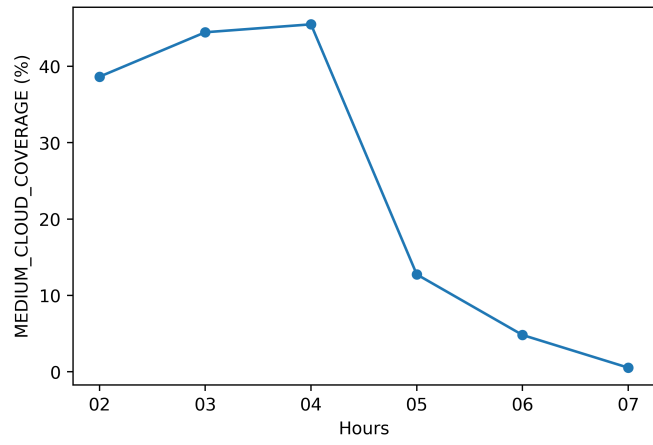


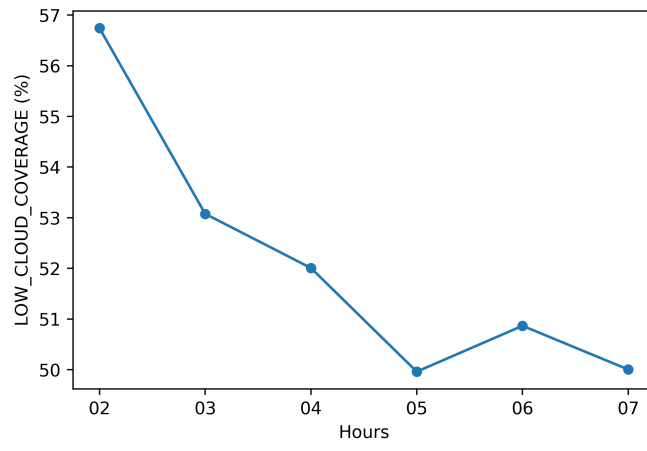
Cluster 5 with 4 elements:
20180902 by boat 4
20180902 by boat 7
20180915 by boat 9
20180915 by boat 8











Cluster 6 with 3 elements:
20180825 by boat 9
20180829 by boat 9
20180902 by boat 9

