

Cold Springs Orchard 2021 Infection period analysis

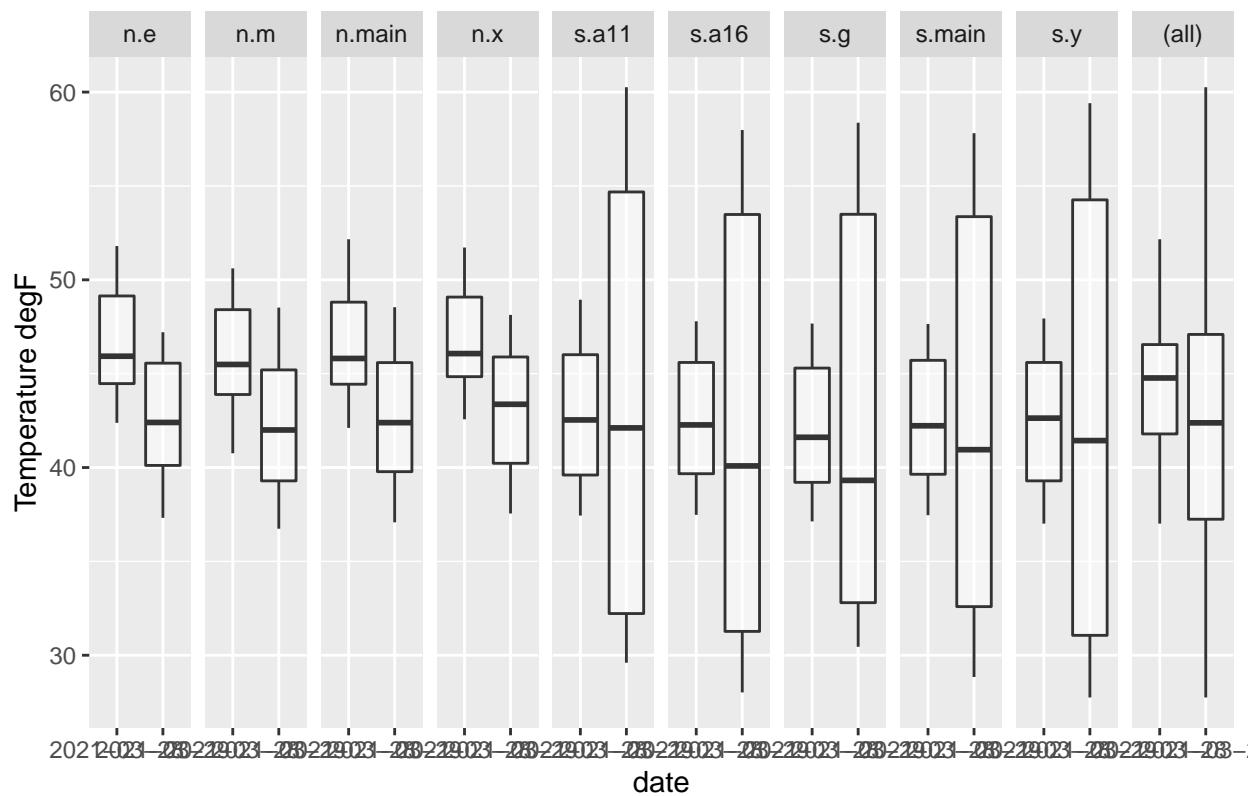
Evan Krause

2022-04-17

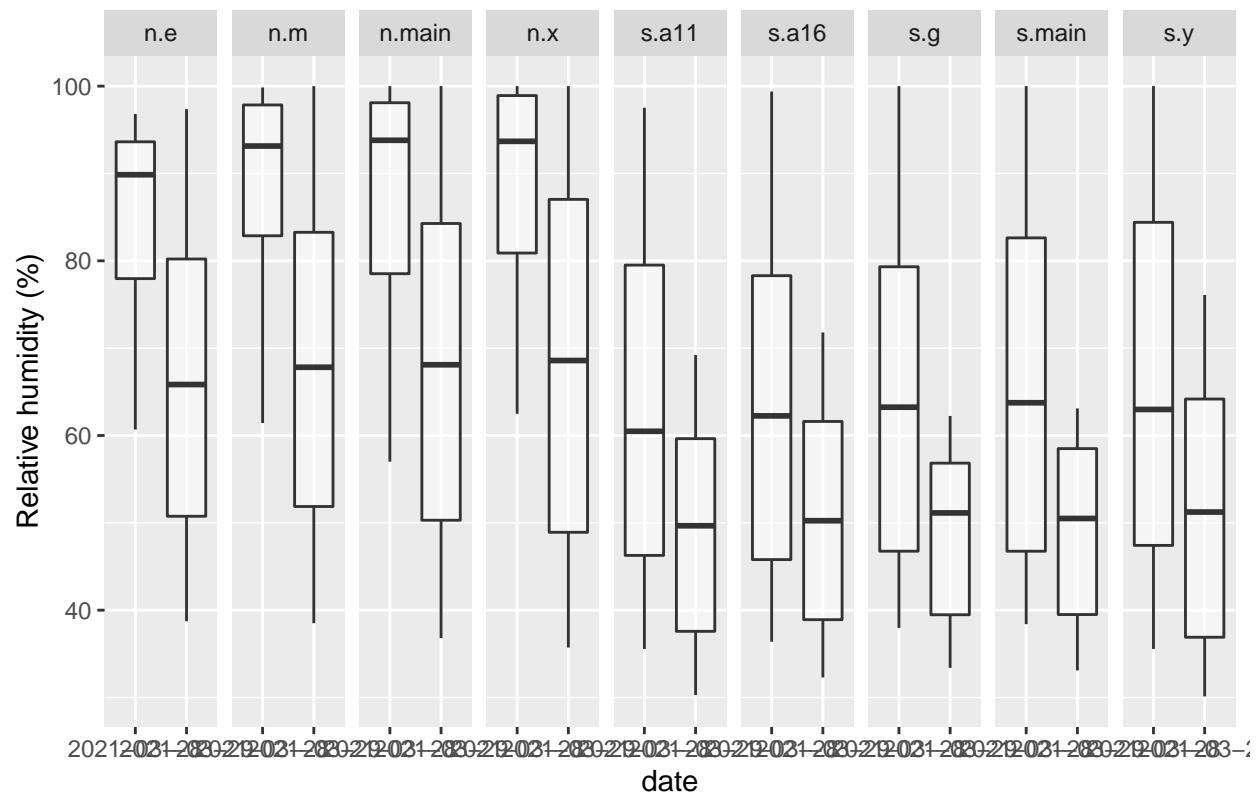
2021 NEWA infection periods graphical exploration

March 28th - 29th

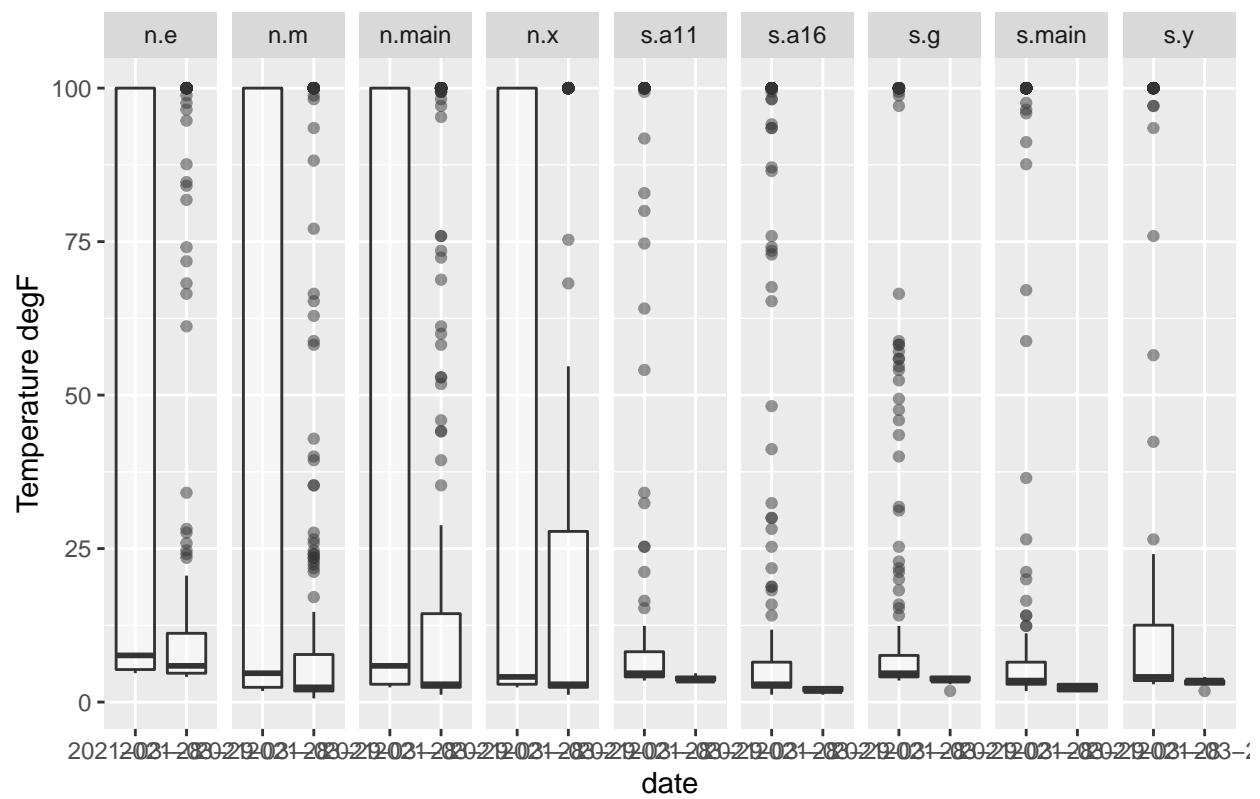
CSO site temperatures by day March 28th – 29th, 2021



CSO site Relative humidity by day March 28th – 29th, 2021

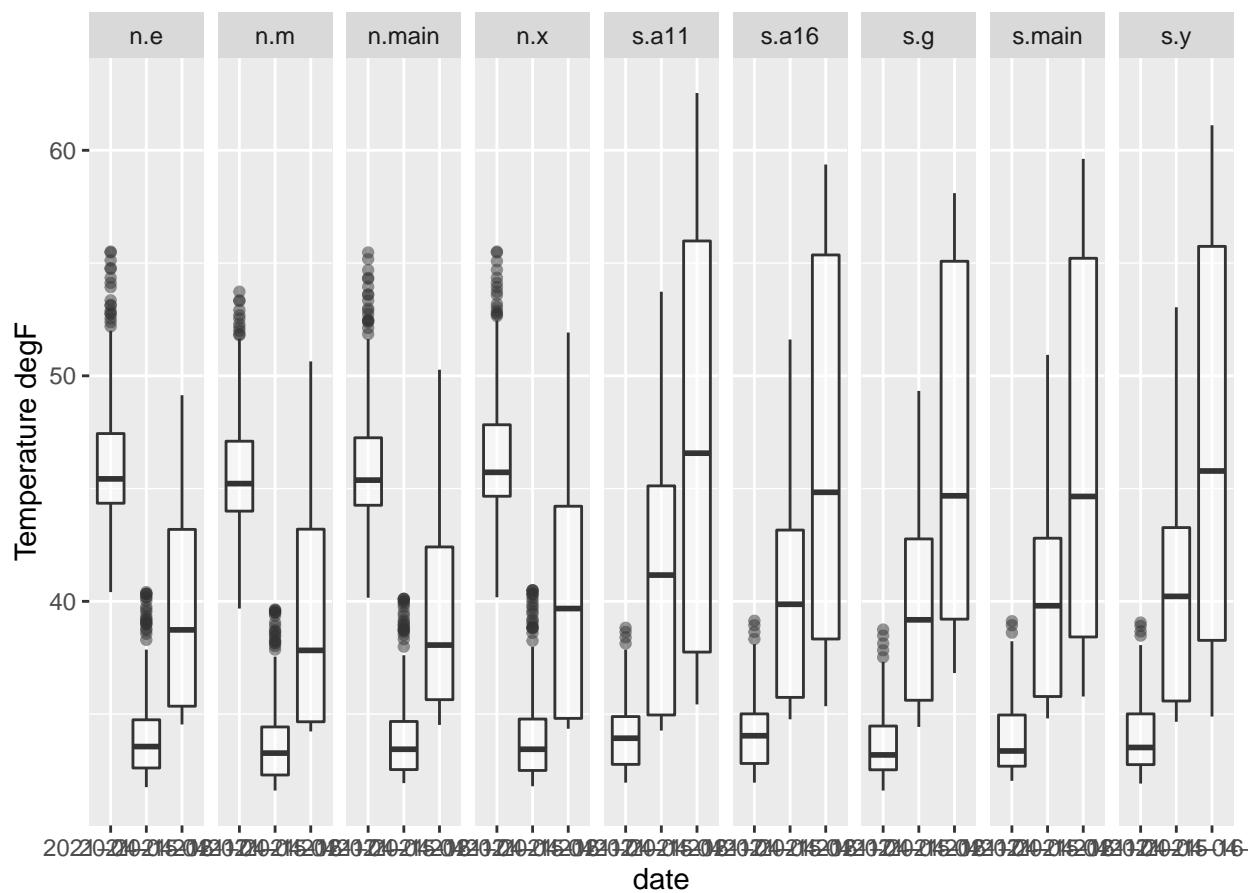


CSO site Leaf wetness by day April 28th – 30th, 2021

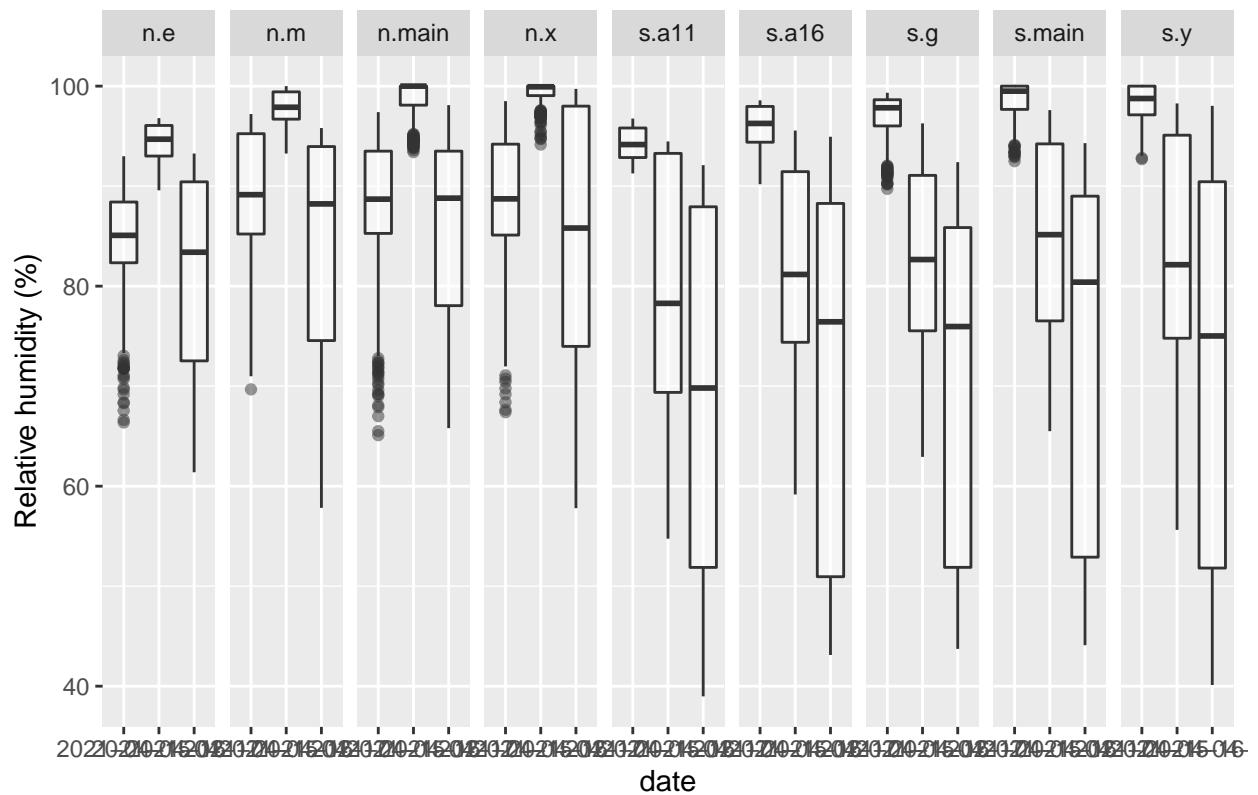


April 15th - 17th

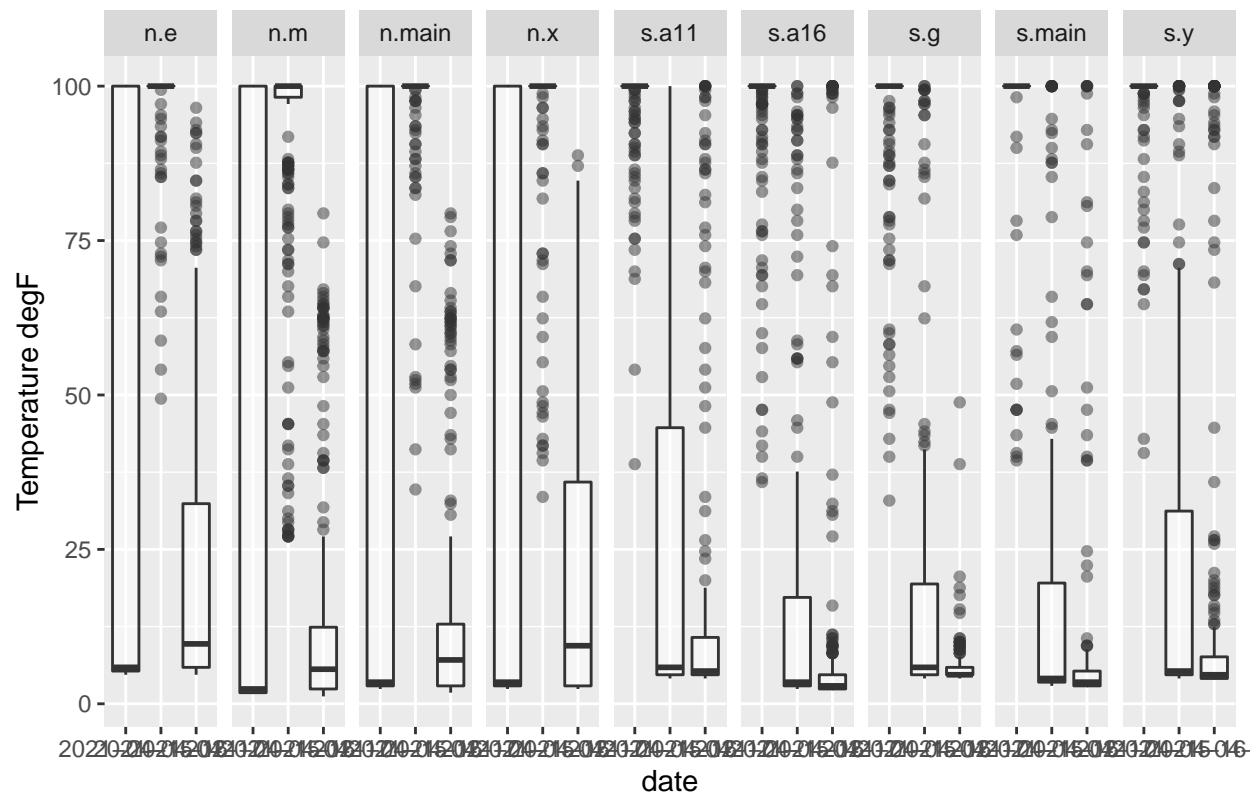
CSO site temperatures by day April 15th – 17th, 2021



CSO site Relative humidity by day April 15th – 17th, 2021

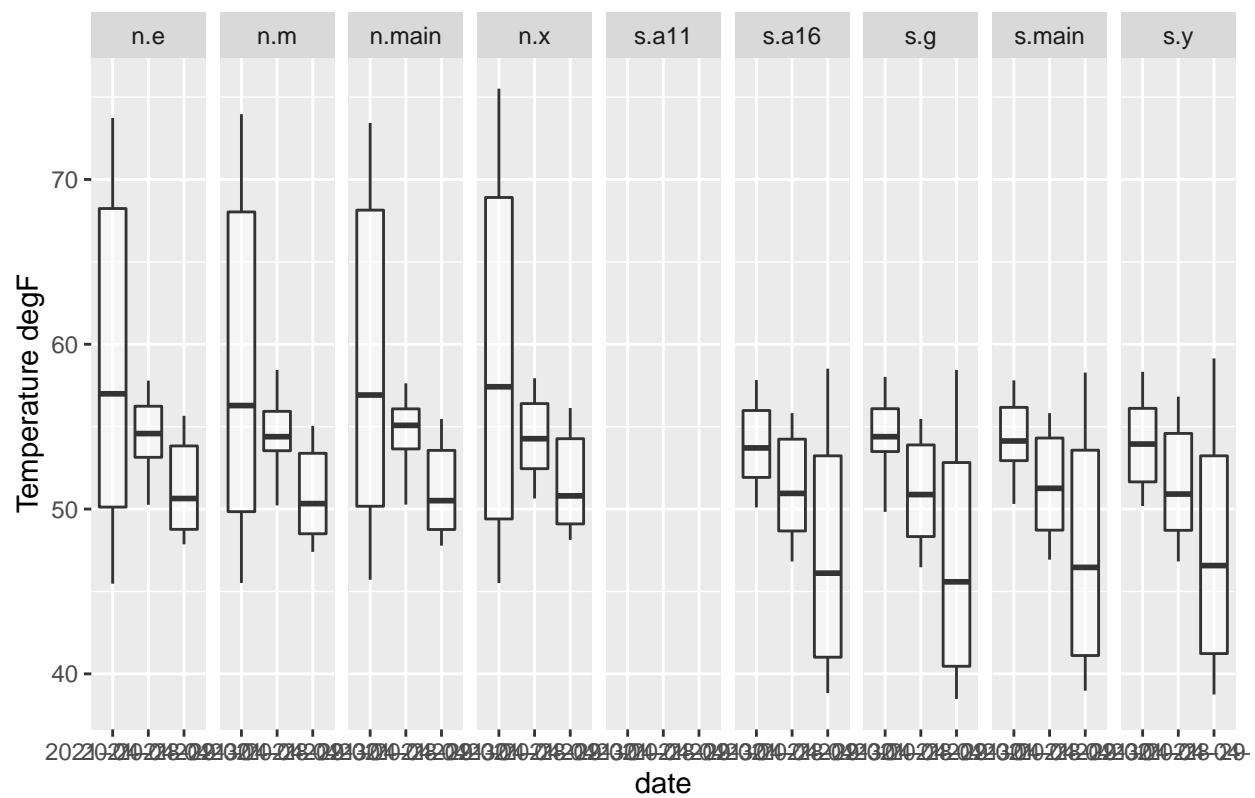


CSO site Leaf Wetness by day April 28th – 30th, 2021

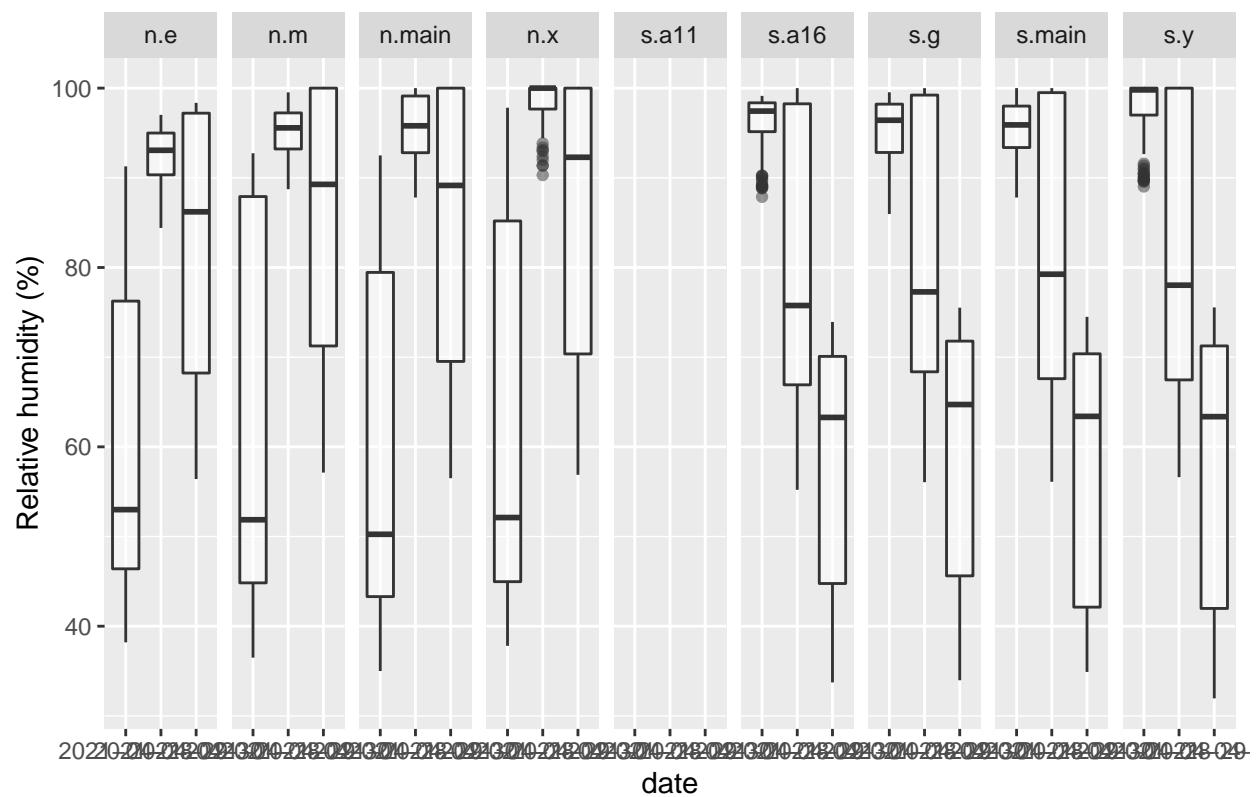


April 28th - 30th

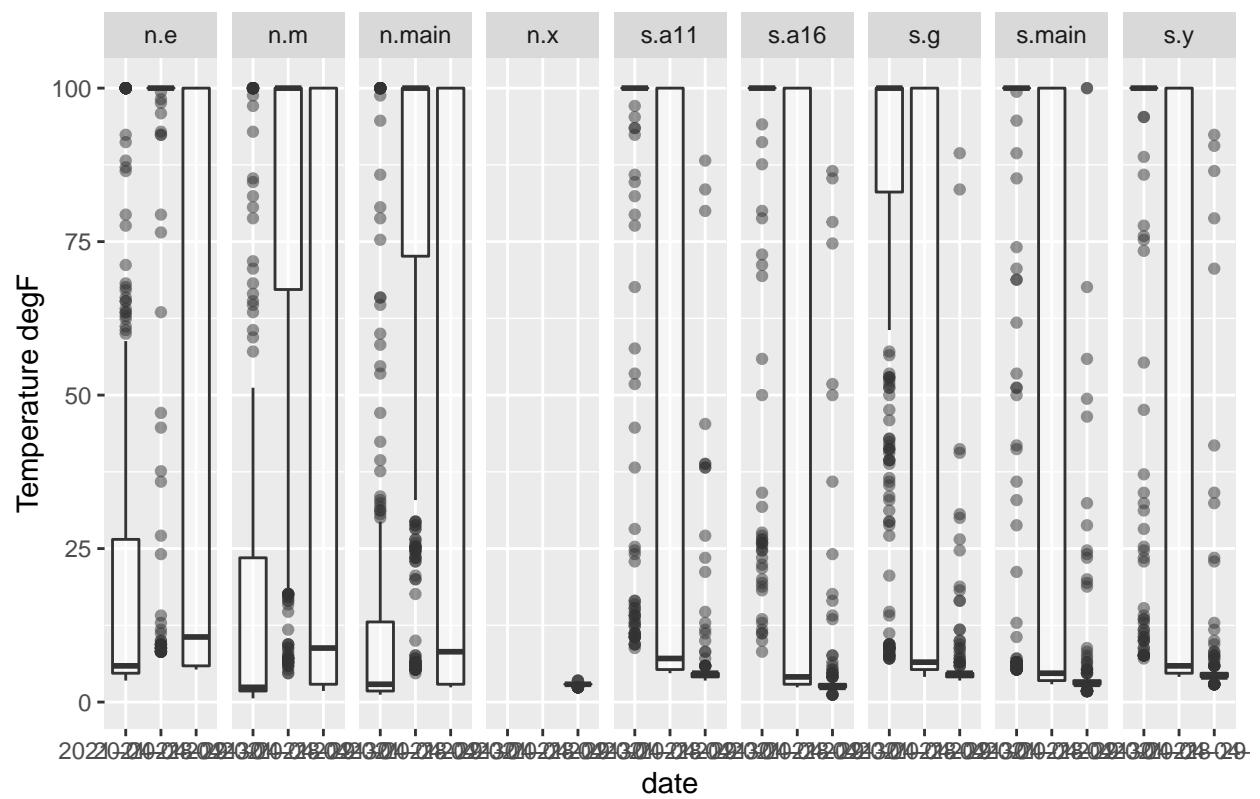
CSO site temperatures by day April 28th – 30th, 2021



CSO site Relative humidity by day April 28th – 30th, 2021

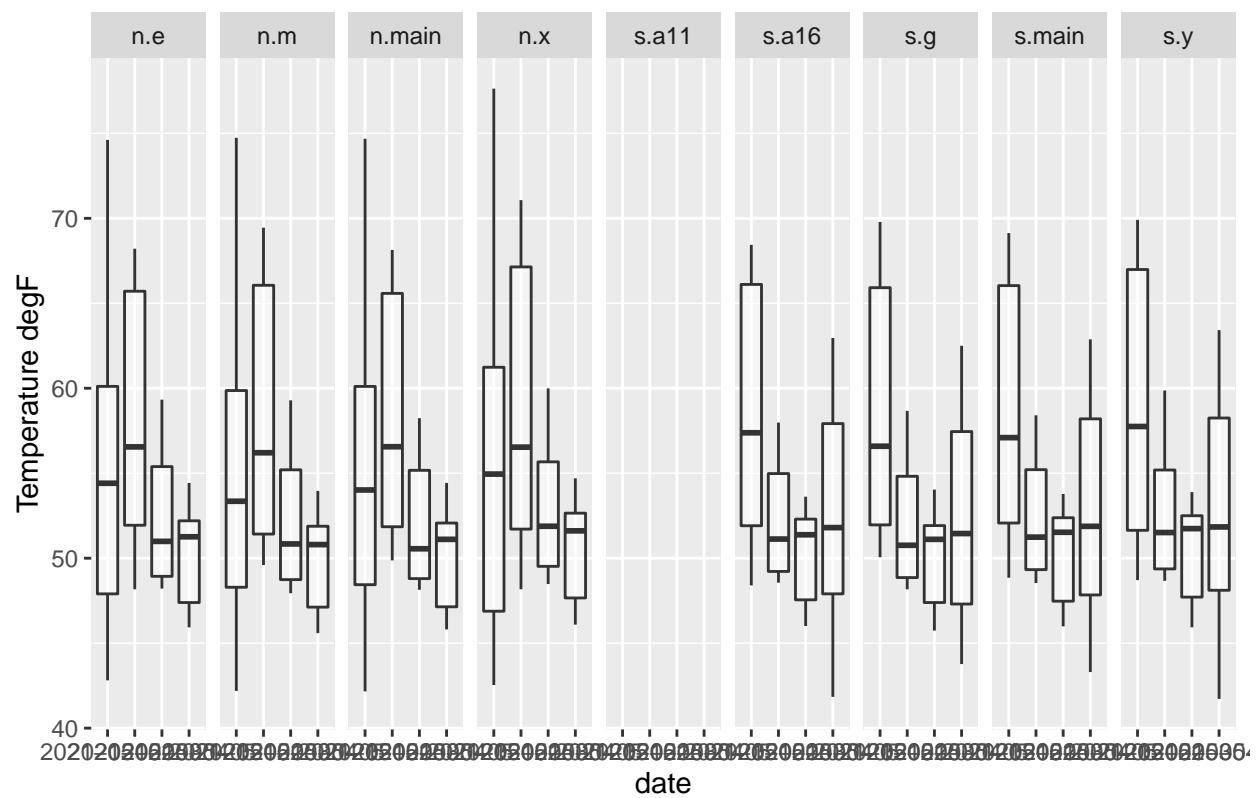


CSO site Leaf Wetness by day April 28th – 30th, 2021

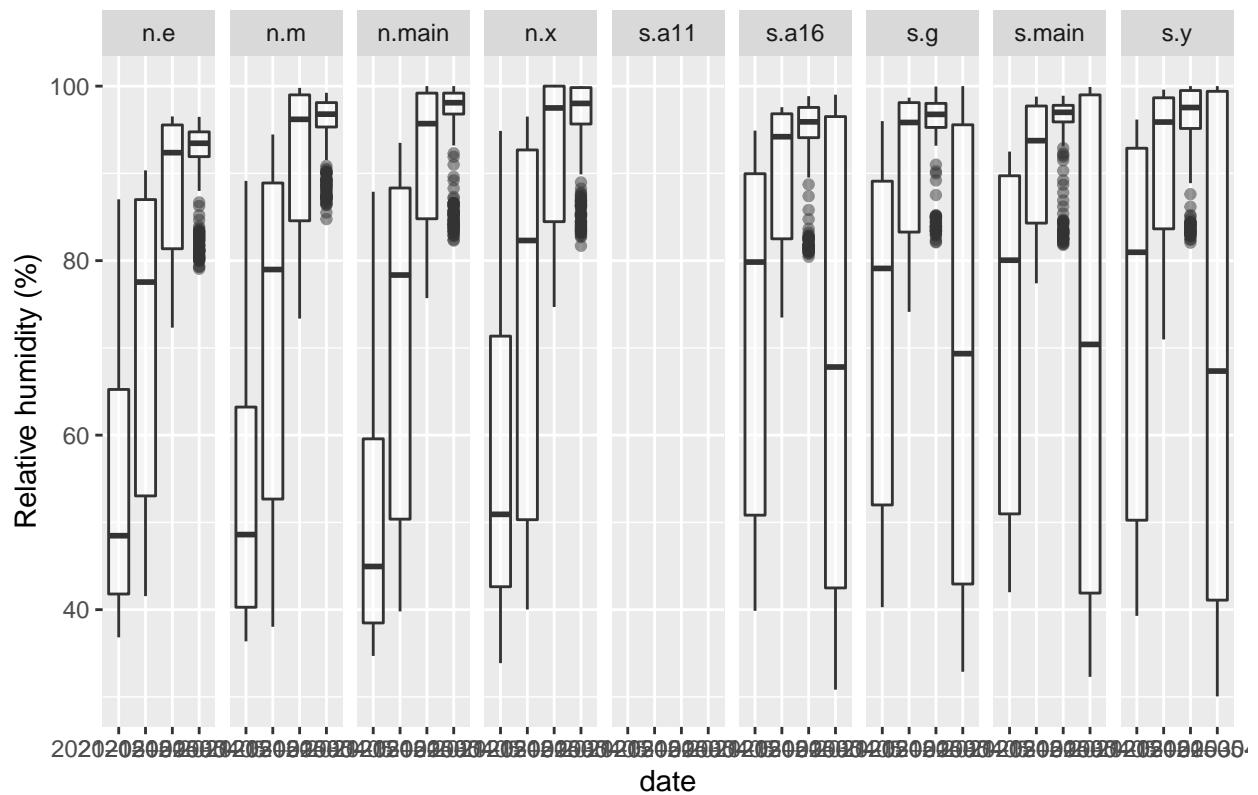


May 2nd - 5th

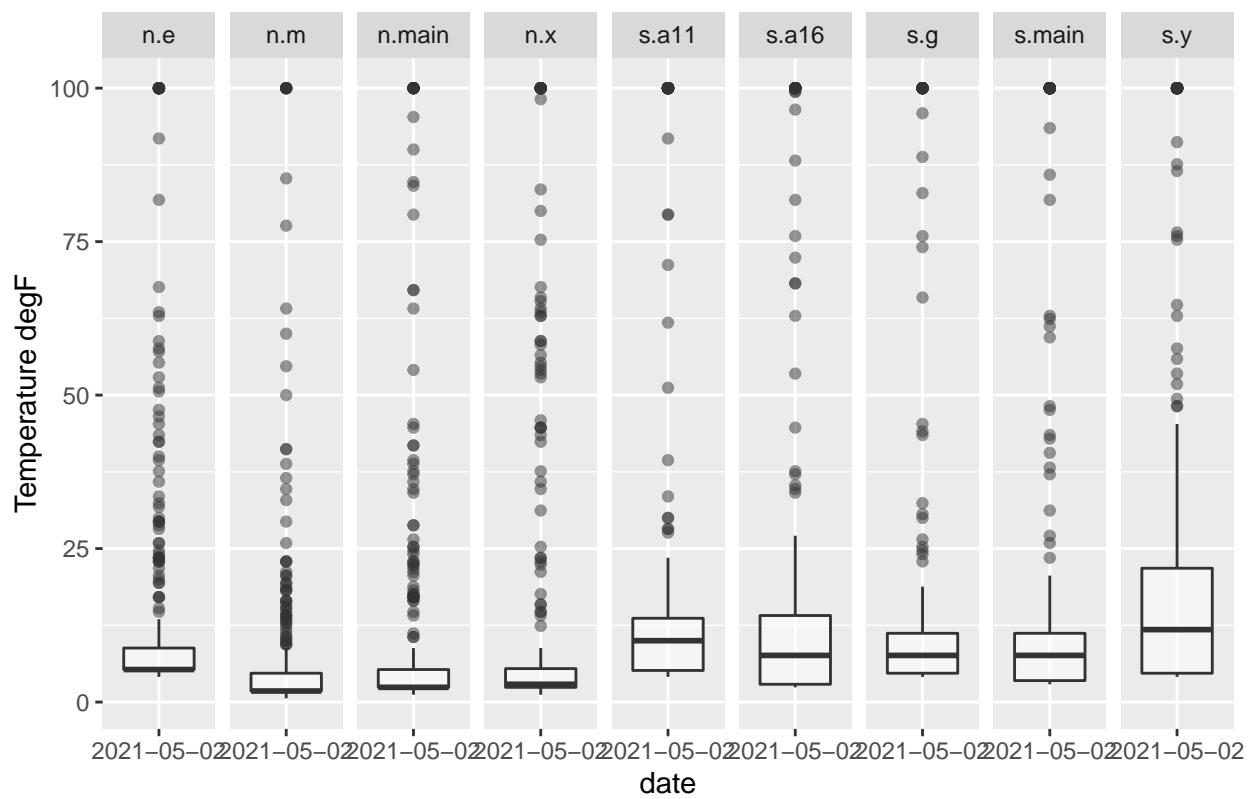
CSO site temperatures by day May 2nd – 5th, 2021



CSO site Relative humidity by day May 2nd – 5th, 2021



CSO site Leaf Wetness by day May 2nd – 5th, 2021



ANOVA and Post-Hoc

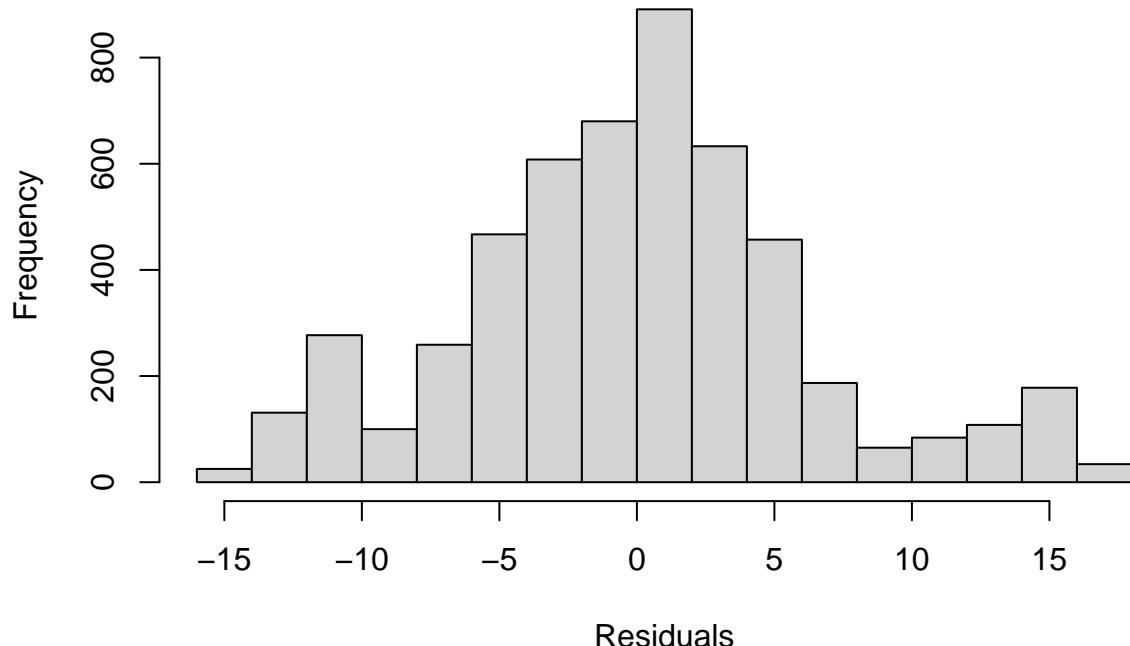
By Infection period

March 28th - 29th

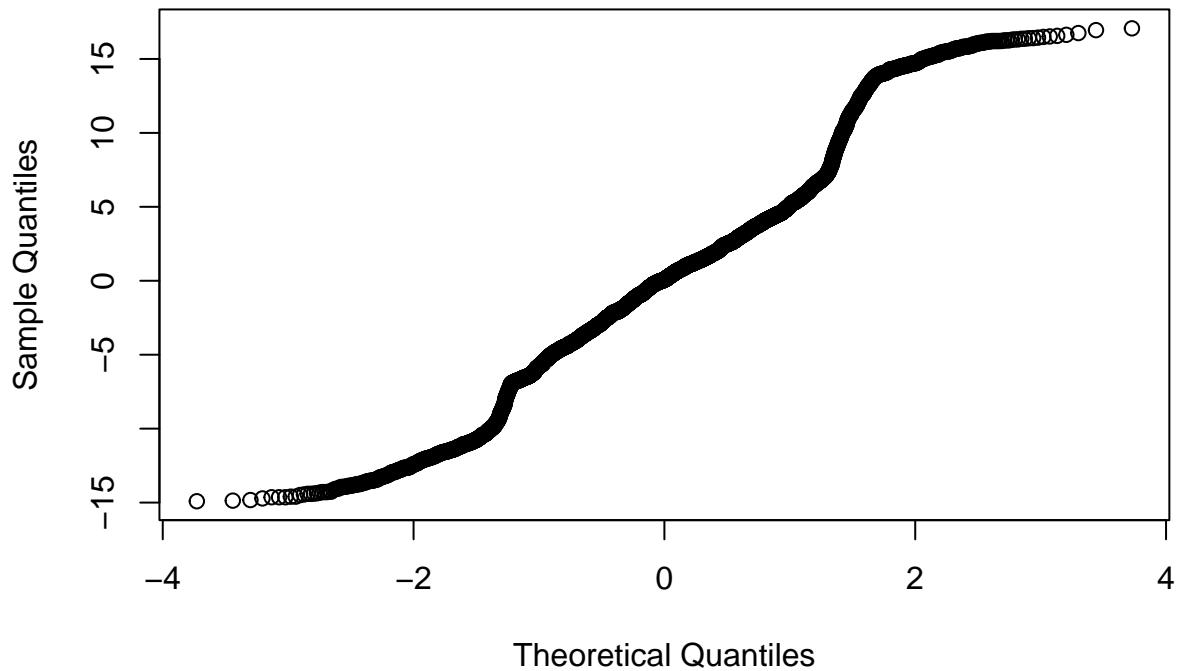
Temperature

```
## Analysis of Variance Table
##
## Response: temp
##           Df Sum Sq Mean Sq F value    Pr(>F)
## site       8  4720  590.01  14.715 < 2.2e-16 ***
## Residuals 5175 207494   40.10
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

March 28th – 29th Temperature anova



Normal Q-Q Plot



```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-03-28" & date <= "2021-03-29"))
##
## $site
##          diff      lwr      upr   p adj
## s.g-s.a16  0.06506944 -1.0927501 1.222889 1.0000000
## s.y-s.a16  0.24644097 -0.9113786 1.404261 0.9992129
## s.main-s.a16 0.29401042 -0.8638092 1.451830 0.9972074
## s.a11-s.a16 0.77819444 -0.3796251 1.936014 0.4832976
## n.m-s.a16  1.61682292  0.4590033 2.774643 0.0005080
## n.main-s.a16 2.13104167  0.9732221 3.288861 0.0000004
## n.e-s.a16  2.22595486  1.0681353 3.383774 0.0000001
## n.x-s.a16  2.45449653  1.2966769 3.612316 0.0000000
## s.y-s.g    0.18137153 -0.9764481 1.339191 0.9999205
## s.main-s.g 0.22894097 -0.9288786 1.386761 0.9995422
## s.a11-s.g  0.71312500 -0.4446946 1.870945 0.6059287
## n.m-s.g   1.55175347  0.3939339 2.709573 0.0010830
## n.main-s.g 2.06597222  0.9081526 3.223792 0.0000012
## n.e-s.g   2.16088542  1.0030658 3.318705 0.0000003
## n.x-s.g   2.38942708  1.2316075 3.547247 0.0000000
## s.main-s.y 0.04756944 -1.1102501 1.205389 1.0000000
## s.a11-s.y  0.53175347 -0.6260661 1.689573 0.8884025
## n.m-s.y   1.37038194  0.2125624 2.528202 0.0074669

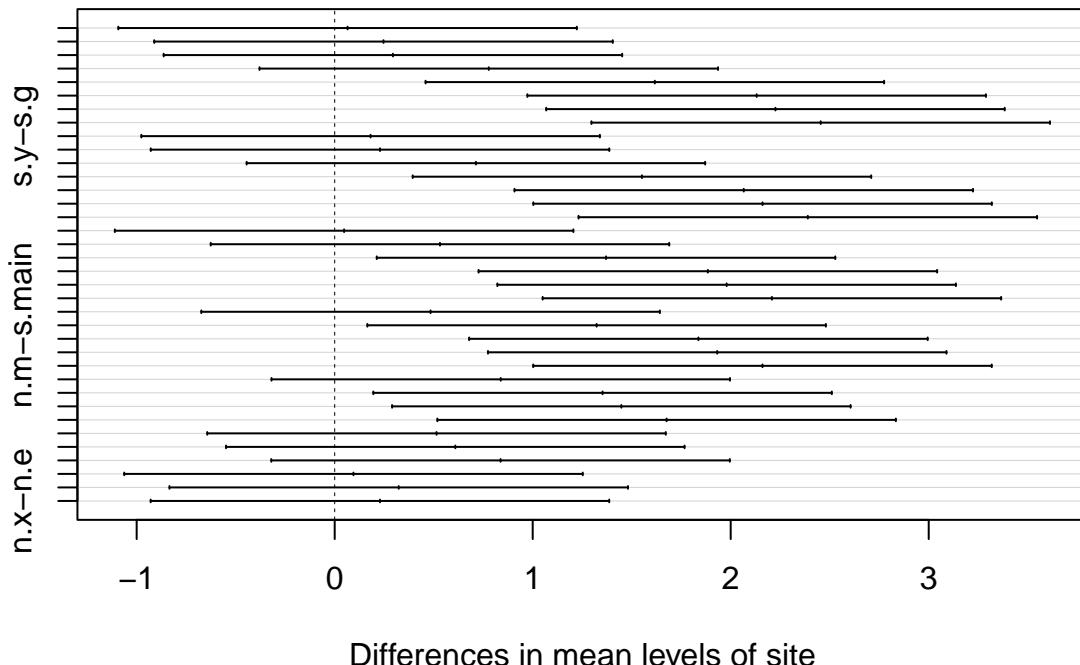
```

```

## n.main-s.y    1.88460069  0.7267811 3.042420 0.0000161
## n.e-s.y     1.97951389  0.8216943 3.137333 0.0000042
## n.x-s.y     2.20805556  1.0502360 3.365875 0.0000001
## s.a11-s.main 0.48418403 -0.6736356 1.642004 0.9323210
## n.m-s.main   1.32281250  0.1649929 2.480632 0.0118370
## n.main-s.main 1.83703125  0.6792117 2.994851 0.0000309
## n.e-s.main   1.93194444  0.7741249 3.089764 0.0000083
## n.x-s.main   2.16048611  1.0026665 3.318306 0.0000003
## n.m-s.a11    0.83862847 -0.3191911 1.996448 0.3748266
## n.main-s.a11 1.35284722  0.1950276 2.510667 0.0088693
## n.e-s.a11    1.44776042  0.2899408 2.605580 0.0033867
## n.x-s.a11    1.67630208  0.5184825 2.834122 0.0002471
## n.main-n.m    0.51421875 -0.6436008 1.672038 0.9062483
## n.e-n.m      0.60913194 -0.5486876 1.766952 0.7869471
## n.x-n.m      0.83767361 -0.3201460 1.995493 0.3764589
## n.e-n.main   0.09491319 -1.0629064 1.252733 0.9999995
## n.x-n.main   0.32345486 -0.8343647 1.481274 0.9945875
## n.x-n.e      0.22854167 -0.9292779 1.386361 0.9995480

```

95% family-wise confidence level

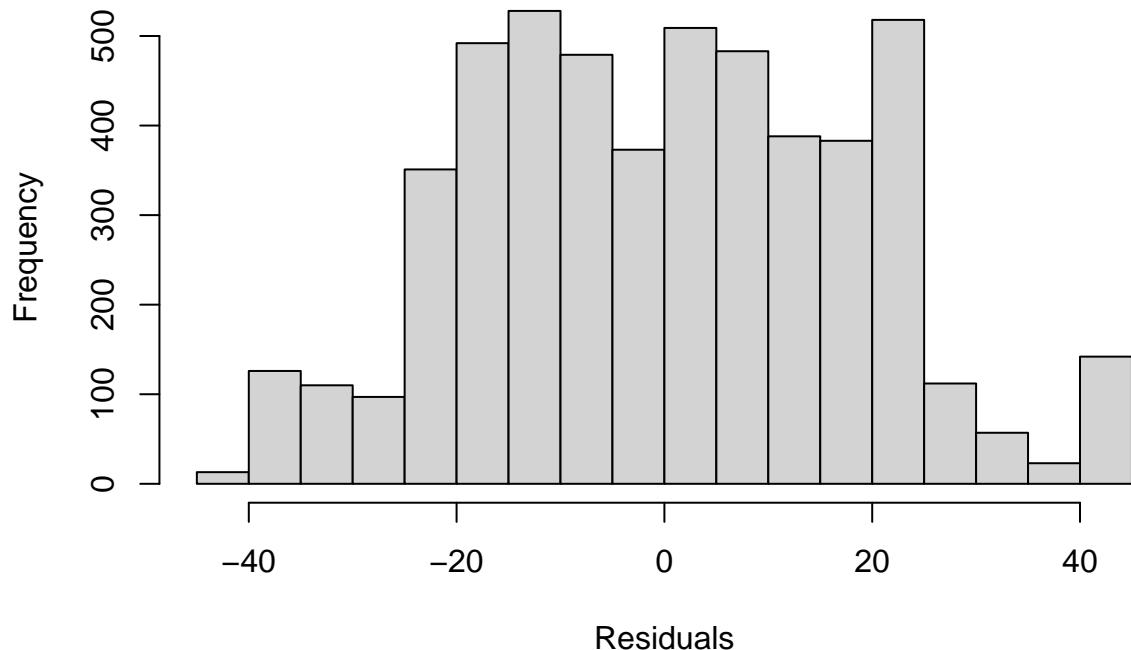


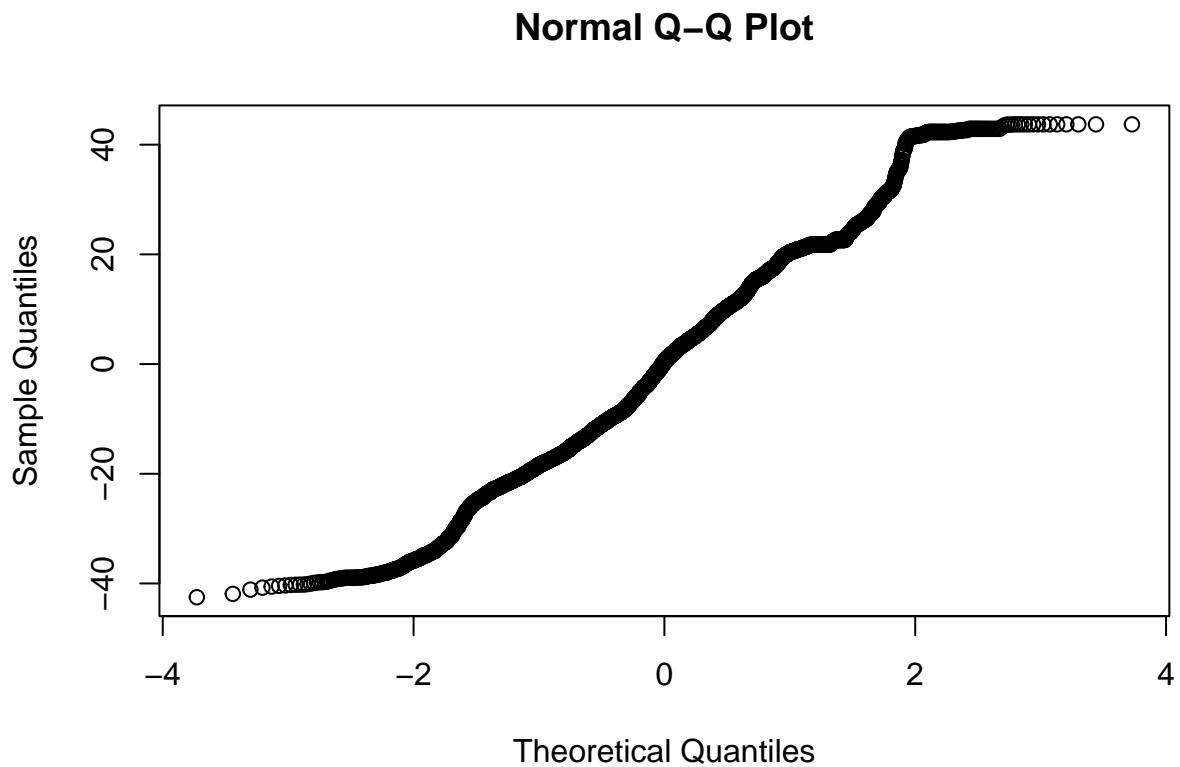
Differences in mean levels of site

Relative Humidity

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site          8  548585   68573  208.02 < 2.2e-16 ***
## Residuals  5175 1705945      330
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

March 28th – 29th Relative humidity anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-03-28" & date <= "2021-03-29"))
##
## $site
##          diff      lwr      upr    p adj
## s.g-s.a11   0.60725694 -2.712606  3.927120 0.9997436
## s.a16-s.a11  1.05253472 -2.267328  4.372398 0.9873954
## s.main-s.a11 1.43413194 -1.885731  4.753995 0.9191499
## s.y-s.a11   1.99890625 -1.320957  5.318769 0.6357786
## n.e-s.a11   19.76508681 16.445224 23.084950 0.0000000
## n.main-s.a11 21.67579861 18.355935 24.995662 0.0000000
## n.x-s.a11   22.53918403 19.219321 25.859047 0.0000000
## n.m-s.a11   22.57461806 19.254755 25.894481 0.0000000
## s.a16-s.g     0.44527778 -2.874585  3.765141 0.9999759
## s.main-s.g    0.82687500 -2.492988  4.146738 0.9975632
## s.y-s.g      1.39164931 -1.928214  4.711513 0.9314165
## n.e-s.g      19.15782986 15.837967 22.477693 0.0000000
## n.main-s.g   21.06854167 17.748678 24.388405 0.0000000
## n.x-s.g      21.93192708 18.612064 25.251790 0.0000000
## n.m-s.g      21.96736111 18.647498 25.287224 0.0000000
## s.main-s.a16  0.38159722 -2.938266  3.701460 0.9999927
## s.y-s.a16    0.94637153 -2.373492  4.266235 0.9937897
## n.e-s.a16    18.71255208 15.392689 22.032415 0.0000000

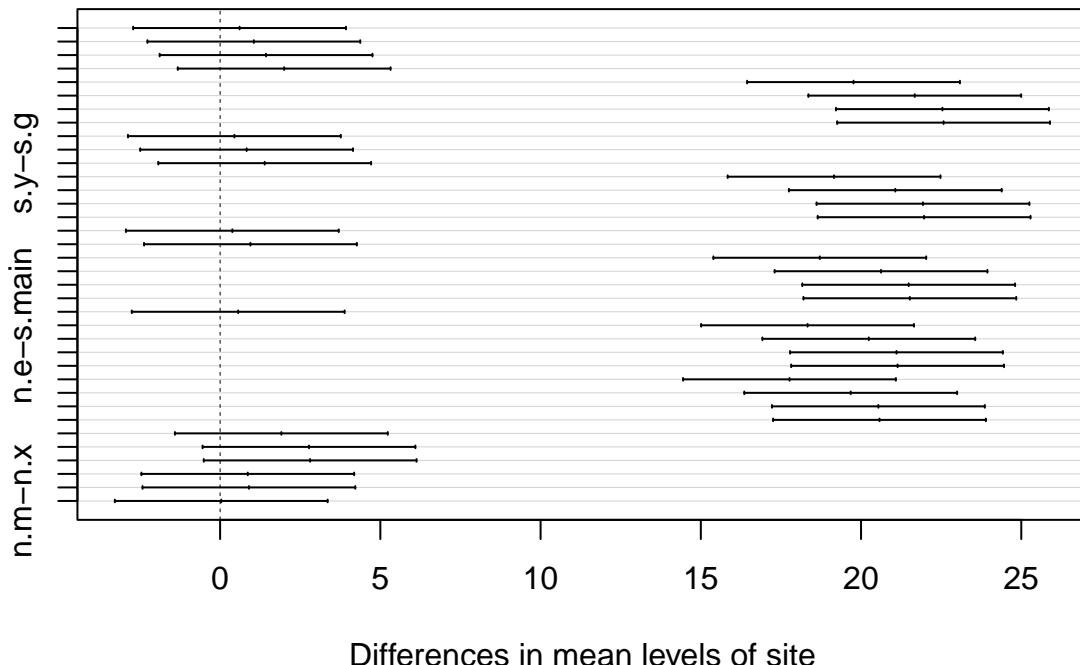
```

```

## n.main-s.a16 20.62326389 17.303401 23.943127 0.0000000
## n.x-s.a16 21.48664931 18.166786 24.806513 0.0000000
## n.m-s.a16 21.52208333 18.202220 24.841947 0.0000000
## s.y-s.main 0.56477431 -2.755089 3.884638 0.9998514
## n.e-s.main 18.33095486 15.011092 21.650818 0.0000000
## n.main-s.main 20.24166667 16.921803 23.561530 0.0000000
## n.x-s.main 21.10505208 17.785189 24.424915 0.0000000
## n.m-s.main 21.14048611 17.820623 24.460349 0.0000000
## n.e-s.y 17.76618056 14.446317 21.086044 0.0000000
## n.main-s.y 19.67689236 16.357029 22.996756 0.0000000
## n.x-s.y 20.54027778 17.220415 23.860141 0.0000000
## n.m-s.y 20.57571181 17.255849 23.895575 0.0000000
## n.main-n.e 1.91071181 -1.409151 5.230575 0.6916883
## n.x-n.e 2.77409722 -0.545766 6.093960 0.1896207
## n.m-n.e 2.80953125 -0.510332 6.129394 0.1759101
## n.x-n.main 0.86338542 -2.456478 4.183249 0.9966994
## n.m-n.main 0.89881944 -2.421044 4.218683 0.9956363
## n.m-n.x 0.03543403 -3.284429 3.355297 1.0000000

```

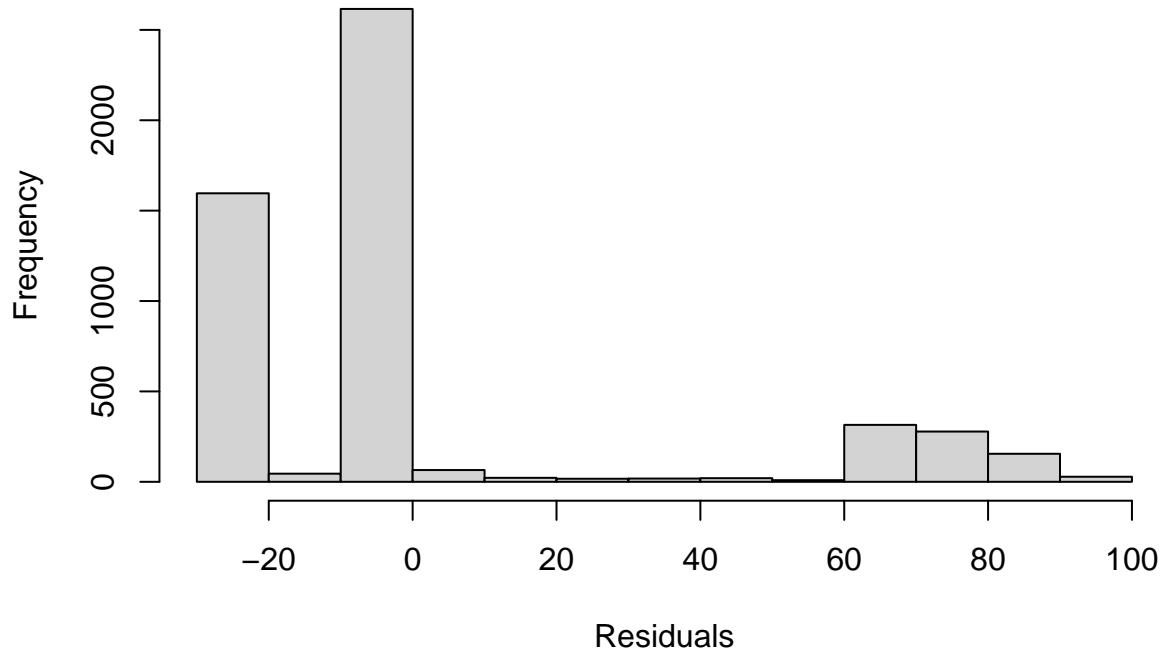
95% family-wise confidence level



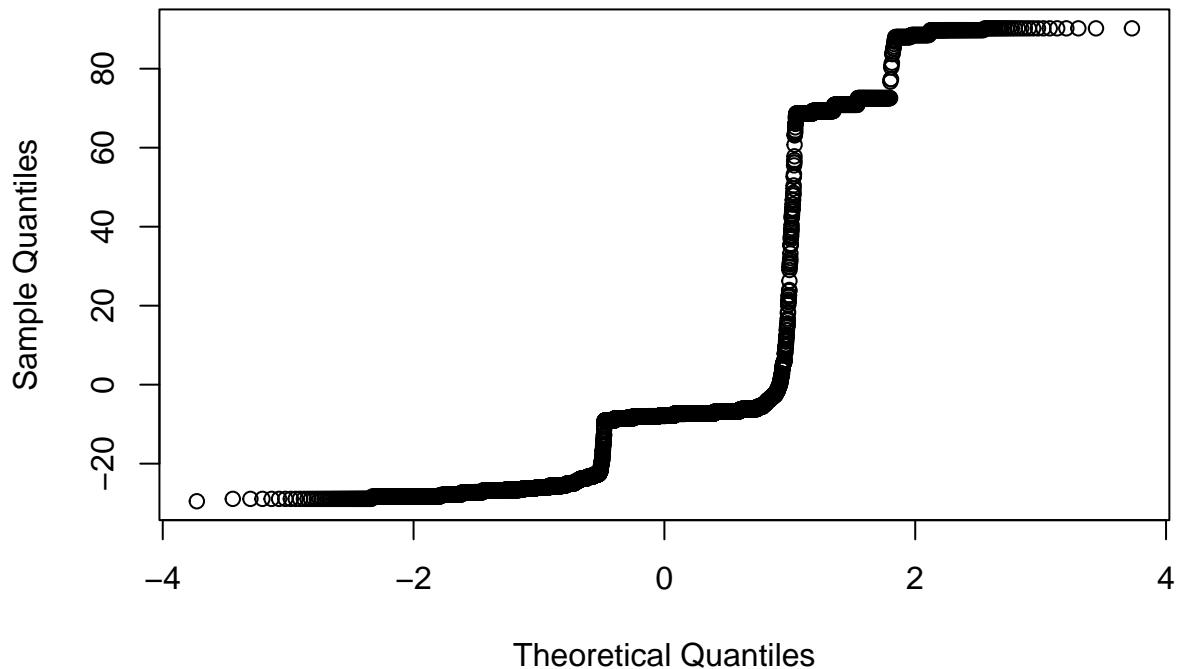
Leaf Wetness

```
## Analysis of Variance Table
##
## Response: wet
##          Df  Sum Sq Mean Sq F value    Pr(>F)
## site       8  465319   58165  52.813 < 2.2e-16 ***
## Residuals 5175 5699423    1101
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

March 28th – 29th Leaf Wetness anova



Normal Q-Q Plot



```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-03-28" & date <= "2021-03-29"))
##
## $site
##          diff      lwr      upr   p adj
## s.main-s.a16  0.45815972 -5.609945  6.526265 0.99999997
## s.g-s.a16    0.47552083 -5.592584  6.543626 0.99999996
## s.a11-s.a16   1.69114583 -4.376959  7.759251 0.9946758
## s.y-s.a16    2.20381944 -3.864286  8.271924 0.9702683
## n.m-s.a16    17.65833333 11.590228 23.726438 0.00000000
## n.main-s.a16 19.37100694 13.302902 25.439112 0.00000000
## n.x-s.a16    20.92777778 14.859673 26.995883 0.00000000
## n.e-s.a16    21.57239583 15.504291 27.640501 0.00000000
## s.g-s.main    0.01736111 -6.050744  6.085466 1.00000000
## s.a11-s.main   1.23298611 -4.835119  7.301091 0.9994402
## s.y-s.main    1.74565972 -4.322445  7.813765 0.9933933
## n.m-s.main    17.20017361 11.132069 23.268279 0.00000000
## n.main-s.main 18.91284722 12.844742 24.980952 0.00000000
## n.x-s.main    20.46961806 14.401513 26.537723 0.00000000
## n.e-s.main    21.11423611 15.046131 27.182341 0.00000000
## s.a11-s.g     1.21562500 -4.852480  7.283730 0.9994958
## s.y-s.g       1.72829861 -4.339806  7.796404 0.9938260
## n.m-s.g       17.18281250 11.114707 23.250918 0.00000000

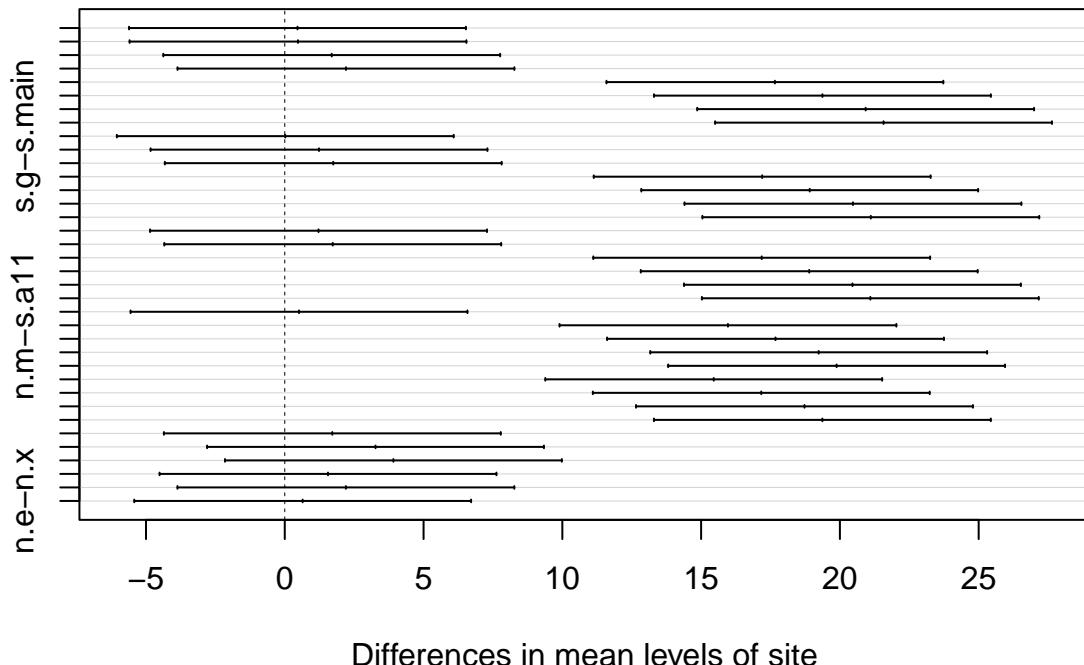
```

```

## n.main-s.g      18.89548611 12.827381 24.963591 0.0000000
## n.x-s.g       20.45225694 14.384152 26.520362 0.0000000
## n.e-s.g       21.09687500 15.028770 27.164980 0.0000000
## s.y-s.a11     0.51267361 -5.555431  6.580779 0.9999993
## n.m-s.a11    15.96718750  9.899082 22.035293 0.0000000
## n.main-s.a11 17.67986111 11.611756 23.747966 0.0000000
## n.x-s.a11    19.23663194 13.168527 25.304737 0.0000000
## n.e-s.a11    19.88125000 13.813145 25.949355 0.0000000
## n.m-s.y      15.45451389  9.386409 21.522619 0.0000000
## n.main-s.y   17.16718750 11.099082 23.235293 0.0000000
## n.x-s.y      18.72395833 12.655853 24.792063 0.0000000
## n.e-s.y      19.36857639 13.300471 25.436681 0.0000000
## n.main-n.m   1.71267361 -4.355431  7.780779 0.9941958
## n.x-n.m     3.26944444 -2.798661  9.337549 0.7638742
## n.e-n.m     3.91406250 -2.154043  9.982168 0.5422958
## n.x-n.main  1.55677083 -4.511334  7.624876 0.9969992
## n.e-n.main  2.20138889 -3.866716  8.269494 0.9704677
## n.e-n.x     0.64461806 -5.423487  6.712723 0.9999961

```

95% family-wise confidence level

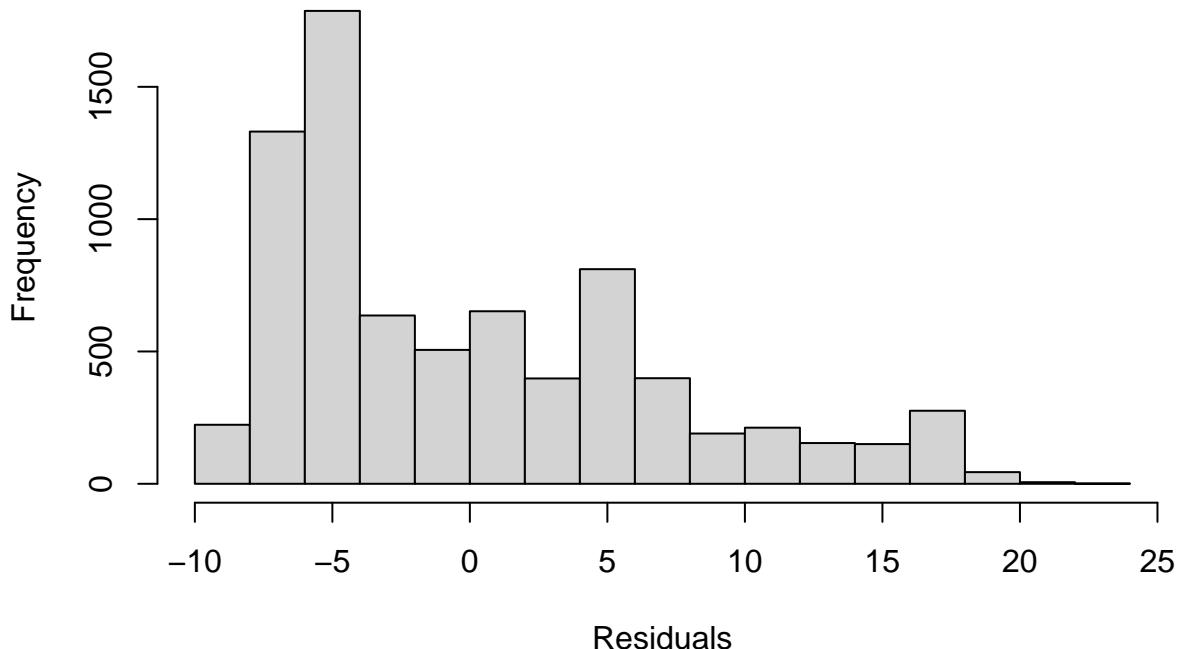


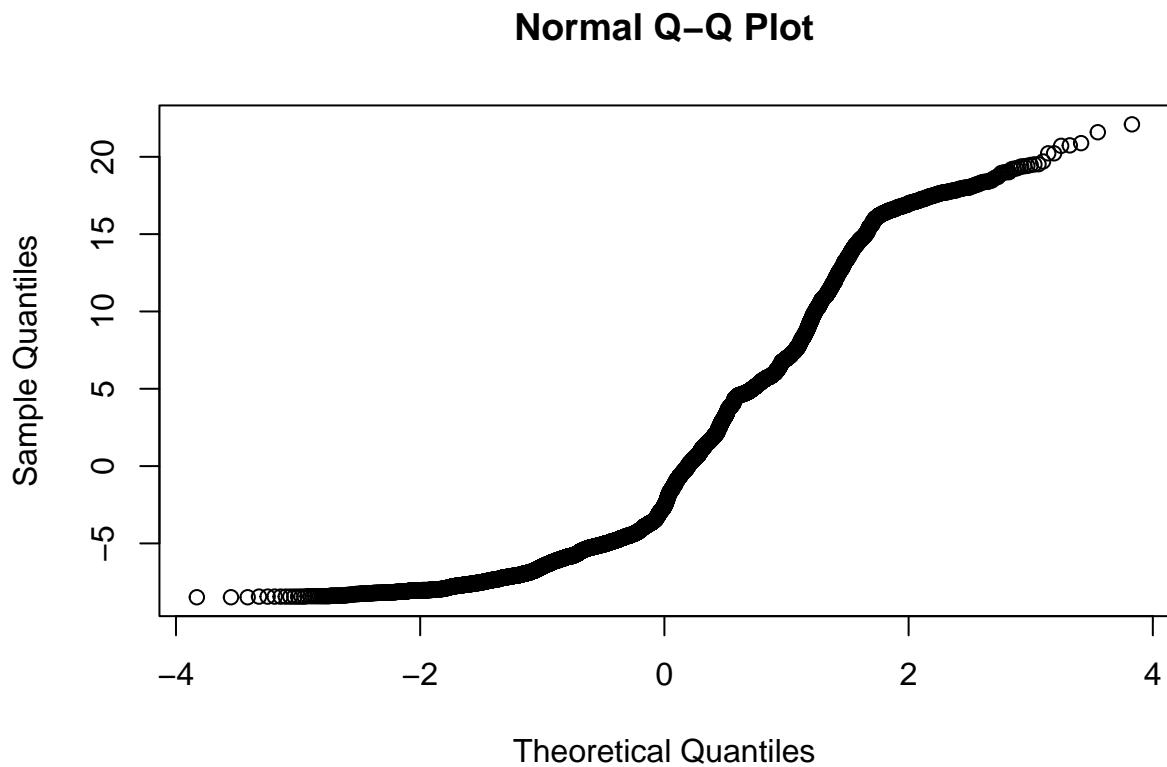
April 15th - 17th

Temperature

```
## Analysis of Variance Table
##
## Response: temp
##           Df Sum Sq Mean Sq F value Pr(>F)
## site          8   694   86.766  1.7887 0.07422 .
## Residuals 7767 376755  48.507
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 15th – 17th Temperature anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-04-15" & date <= "2021-04-17"))
##
## $site
##          diff      lwr      upr   p adj
## n.main-n.m 0.28641204 -0.75324030 1.326064 0.9950889
## n.e-n.m    0.44744213 -0.59221021 1.487094 0.9208453
## s.g-n.m    0.59006944 -0.44958290 1.629722 0.7081133
## n.x-n.m    0.60821759 -0.43143475 1.647870 0.6721896
## s.main-n.m 0.72444444 -0.31520790 1.764097 0.4309731
## s.a16-n.m  0.75746528 -0.28218706 1.797118 0.3665872
## s.y-n.m    0.85185185 -0.18780049 1.891504 0.2119644
## s.a11-n.m  1.06732639  0.02767405 2.106979 0.0389391
## n.e-n.main 0.16103009 -0.87862225 1.200682 0.9999272
## s.g-n.main 0.30365741 -0.73599493 1.343310 0.9926914
## n.x-n.main 0.32180556 -0.71784679 1.361458 0.9892423
## s.main-n.main 0.43803241 -0.60161993 1.477685 0.9295339
## s.a16-n.main 0.47105324 -0.56859910 1.510706 0.8960220
## s.y-n.main  0.56543981 -0.47421253 1.605092 0.7544995
## s.a11-n.main 0.78091435 -0.25873799 1.820567 0.3237093
## s.g-n.e     0.14262731 -0.89702503 1.182280 0.9999713
## n.x-n.e    0.16077546 -0.87887688 1.200428 0.9999281
## s.main-n.e  0.27700231 -0.76265003 1.316655 0.9960999

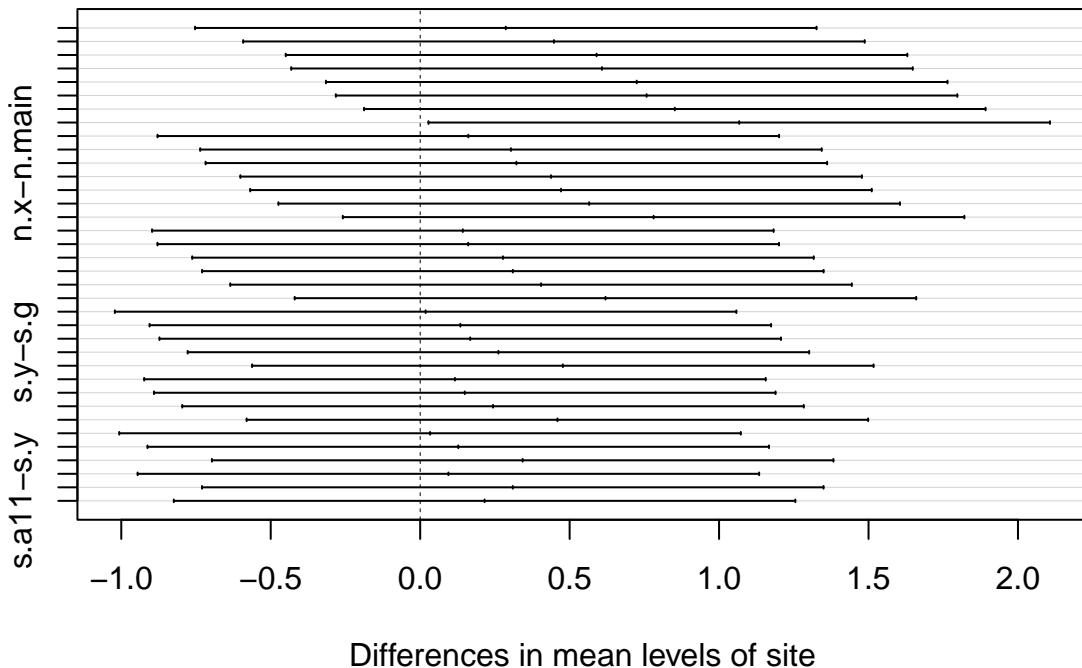
```

```

## s.a16-n.e      0.31002315 -0.72962919 1.349675 0.9916004
## s.y-n.e       0.40440972 -0.63524262 1.444062 0.9552500
## s.a11-n.e     0.61988426 -0.41976808 1.659537 0.6484897
## n.x-s.g       0.01814815 -1.02150419 1.057800 1.0000000
## s.main-s.g    0.13437500 -0.90527734 1.174027 0.9999819
## s.a16-s.g     0.16739583 -0.87225651 1.207048 0.9999022
## s.y-s.g       0.26178241 -0.77786993 1.301435 0.9973726
## s.a11-s.g     0.47725694 -0.56239540 1.516909 0.8887729
## s.main-n.x    0.11622685 -0.92342549 1.155879 0.9999941
## s.a16-n.x     0.14924769 -0.89040466 1.188900 0.9999593
## s.y-n.x       0.24363426 -0.79601808 1.283287 0.9984232
## s.a11-n.x     0.45910880 -0.58054355 1.498761 0.9091250
## s.a16-s.main   0.03302083 -1.00663151 1.072673 1.0000000
## s.y-s.main    0.12740741 -0.91224493 1.167060 0.9999880
## s.a11-s.main   0.34288194 -0.69677040 1.382534 0.9837541
## s.y-s.a16     0.09438657 -0.94526577 1.134039 0.9999989
## s.a11-s.a16   0.30986111 -0.72979123 1.349513 0.9916297
## s.a11-s.y     0.21547454 -0.82417780 1.255127 0.9993535

```

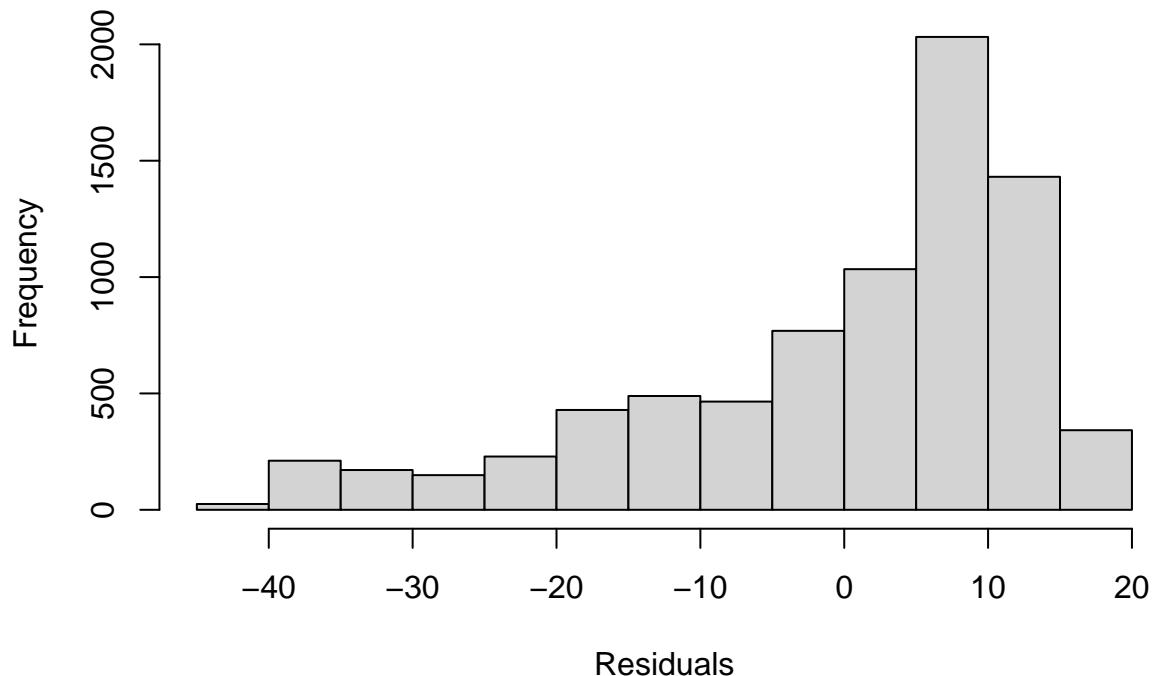
95% family-wise confidence level

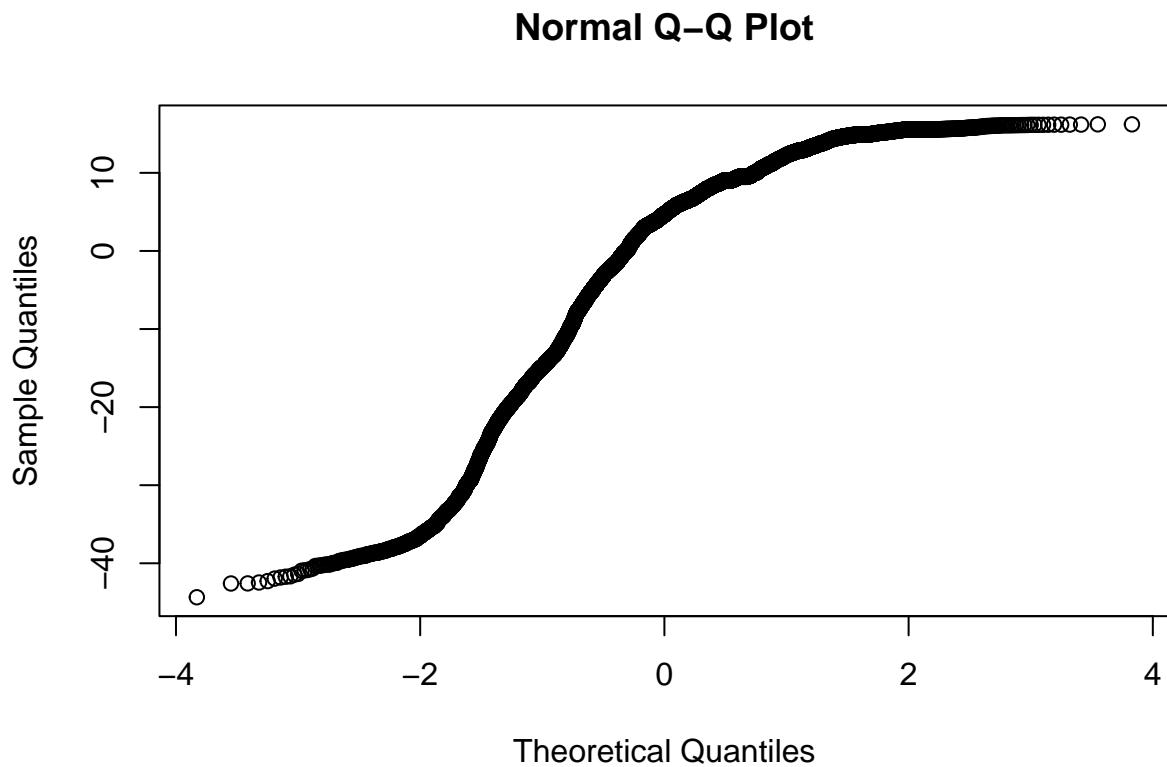


Relative Humidity

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site        8   92019 11502.4  61.886 < 2.2e-16 ***
## Residuals 7767 1443620   185.9
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 15th – 17th Relative Humidity anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-04-15" & date <= "2021-04-17"))
##
## $site
##          diff      lwr      upr   p adj
## s.a16-s.a11 1.3921528 -0.6429447 3.427250 0.4578511
## s.g-s.a11   1.6845949 -0.3505026 3.719692 0.2002206
## s.y-s.a11   3.0257292  0.9906317 5.060827 0.0001399
## s.main-s.a11 3.6118750  1.5767775 5.646973 0.0000013
## n.e-s.a11   5.1650116  3.1299141 7.200109 0.0000000
## n.m-s.a11   8.9399190  6.9048215 10.975016 0.0000000
## n.main-s.a11 9.0636111  7.0285136 11.098709 0.0000000
## n.x-s.a11   9.5123495  7.4772520 11.547447 0.0000000
## s.g-s.a16   0.2924421 -1.7426554 2.327540 0.9999590
## s.y-s.a16   1.6335764 -0.4015211 3.668674 0.2365738
## s.main-s.a16 2.2197222  0.1846247 4.254820 0.0205571
## n.e-s.a16   3.7728588  1.7377613 5.807956 0.0000003
## n.m-s.a16   7.5477662  5.5126687 9.582864 0.0000000
## n.main-s.a16 7.6714583  5.6363608 9.706556 0.0000000
## n.x-s.a16   8.1201968  6.0850993 10.155294 0.0000000
## s.y-s.g     1.3411343 -0.6939632 3.376232 0.5119152
## s.main-s.g   1.9272801 -0.1078174 3.962378 0.0800069
## n.e-s.g     3.4804167  1.4453192 5.515514 0.0000041

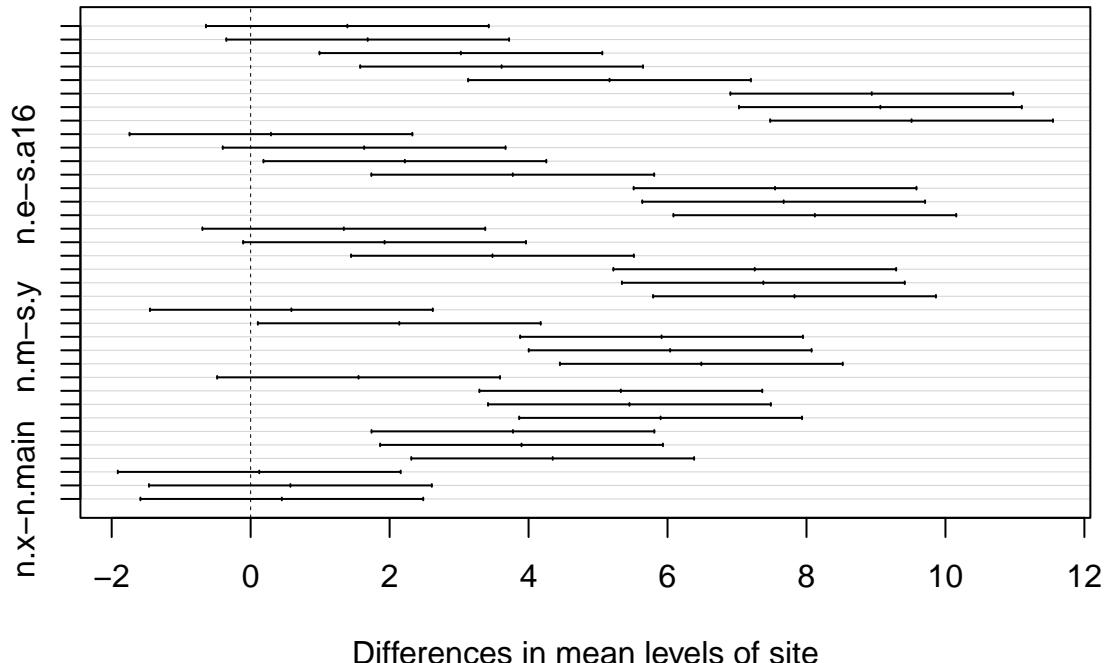
```

```

## n.m-s.g      7.2553241  5.2202266  9.290422 0.0000000
## n.main-s.g   7.3790162  5.3439187  9.414114 0.0000000
## n.x-s.g      7.8277546  5.7926571  9.862852 0.0000000
## s.main-s.y    0.5861458 -1.4489517  2.621243 0.9933498
## n.e-s.y       2.1392824  0.1041849  4.174380 0.0306659
## n.m-s.y       5.9141898  3.8790923  7.949287 0.0000000
## n.main-s.y    6.0378819  4.0027844  8.072979 0.0000000
## n.x-s.y       6.4866204  4.4515229  8.521718 0.0000000
## n.e-s.main    1.5531366 -0.4819609  3.588234 0.3019363
## n.m-s.main    5.3280440  3.2929465  7.363141 0.0000000
## n.main-s.main  5.4517361  3.4166386  7.486834 0.0000000
## n.x-s.main    5.9004745  3.8653770  7.935572 0.0000000
## n.m-n.e       3.7749074  1.7398099  5.810005 0.0000003
## n.main-n.e    3.8985995  1.8635020  5.933697 0.0000001
## n.x-n.e       4.3473380  2.3122405  6.382435 0.0000000
## n.main-n.m    0.1236921 -1.9114054  2.158790 1.0000000
## n.x-n.m       0.5724306 -1.4626669  2.607528 0.9943377
## n.x-n.main    0.4487384 -1.5863591  2.483836 0.9989837

```

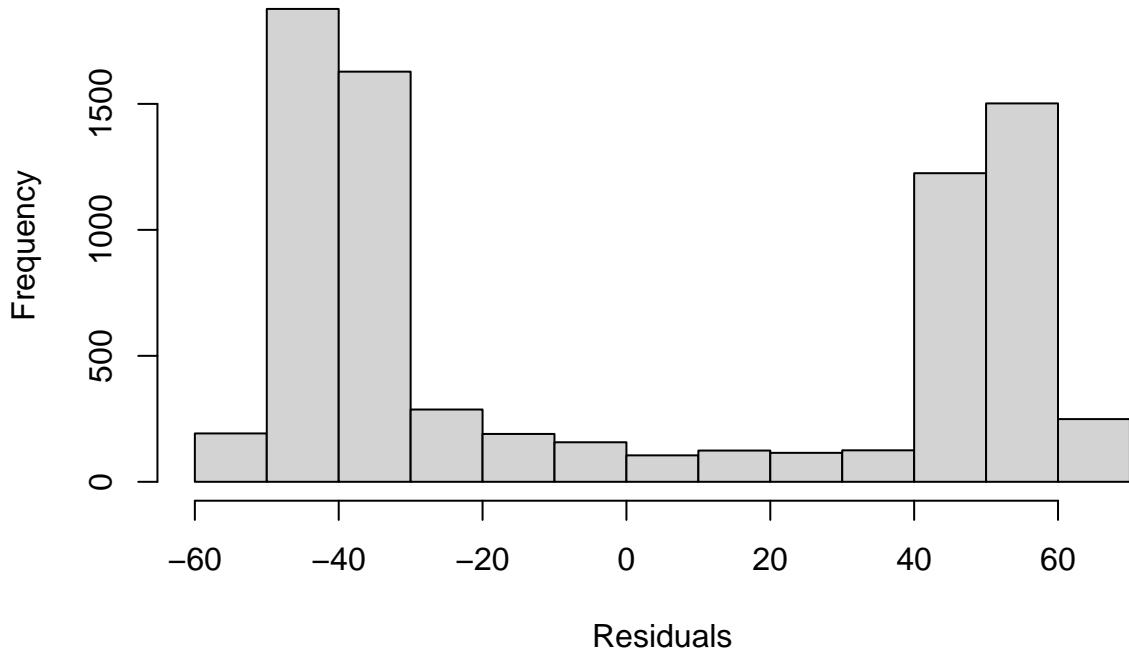
95% family-wise confidence level

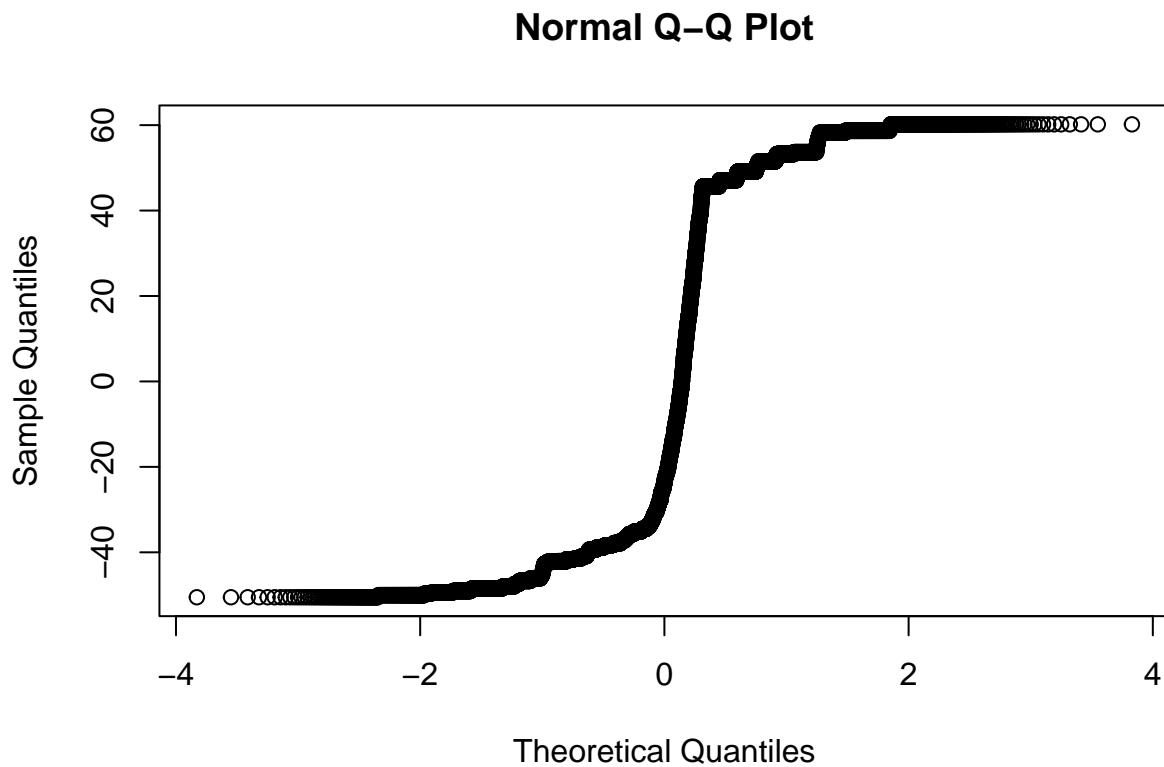


Leaf Wetness

```
## Analysis of Variance Table
##
## Response: wet
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site       8  188389 23548.6 12.056 < 2.2e-16 ***
## Residuals 7767 15170982   1953.3
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 15th – 17th Leaf Wetness anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-04-15" & date <= "2021-04-17"))
##
## $site
##          diff      lwr      upr   p adj
## s.main-s.g  1.5228009 -5.074490165 8.120092 0.9985856
## s.a16-s.g   1.9409722 -4.656318869 8.538263 0.9923253
## s.y-s.g     6.5077546 -0.089536462 13.105046 0.0565979
## s.a11-s.g   6.9579861  0.360695020 13.555277 0.0296282
## n.m-s.g    8.6662037  2.068912612 15.263495 0.0015292
## n.main-s.g 11.0876157  4.490324649 17.684907 0.0000067
## n.x-s.g    13.0988426  6.501551501 19.696134 0.0000000
## n.e-s.g    14.5310185  7.933727427 21.128310 0.0000000
## s.a16-s.main 0.4181713 -6.179119795 7.015462 0.9999999
## s.y-s.main  4.9849537 -1.612337388 11.582245 0.3155229
## s.a11-s.main 5.4351852 -1.162105906 12.032476 0.2056387
## n.m-s.main  7.1434028  0.546111687 13.740694 0.0223117
## n.main-s.main 9.5648148  2.967523724 16.162106 0.0002392
## n.x-s.main 11.5760417  4.978750575 18.173333 0.0000019
## n.e-s.main 13.0082176  6.410926501 19.605509 0.0000000
## s.y-s.a16   4.5667824 -2.030508684 11.164073 0.4406038
## s.a11-s.a16 5.0170139 -1.580277202 11.614305 0.3067624
## n.m-s.a16   6.7252315  0.127940390 13.322523 0.0417111

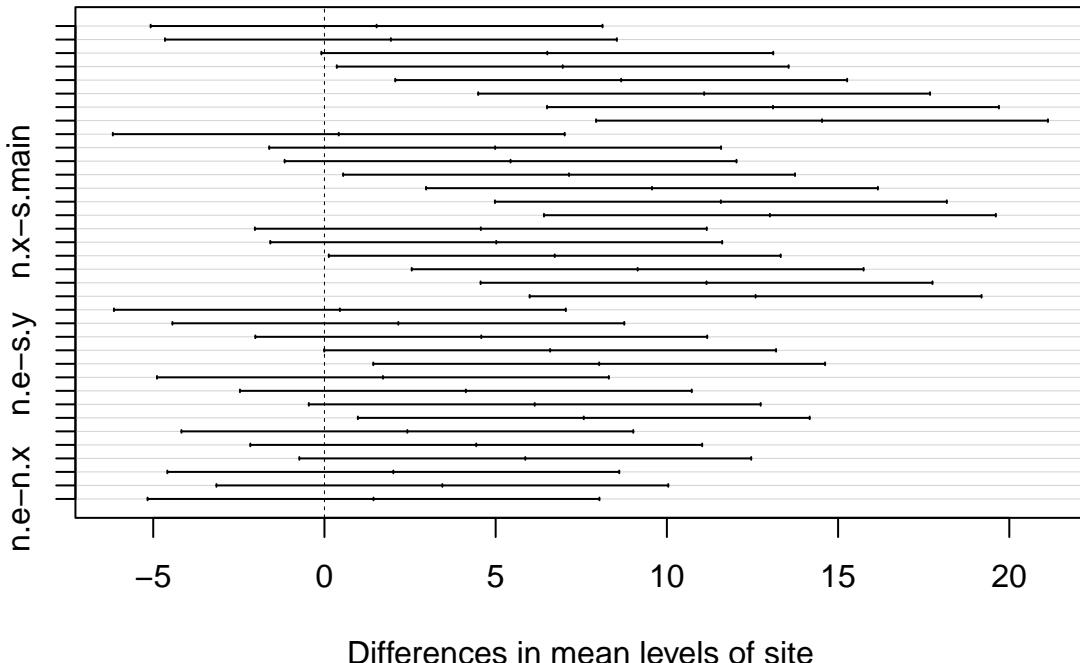
```

```

## n.main-s.a16    9.1466435  2.549352427 15.743935  0.0005810
## n.x-s.a16    11.1578704  4.560579279 17.755161  0.0000056
## n.e-s.a16    12.5900463  5.992755205 19.187337  0.0000001
## s.a11-s.y    0.4502315 -6.147059610  7.047523  0.9999999
## n.m-s.y      2.1584491 -4.438842017  8.755740  0.9845687
## n.main-s.y    4.5798611 -2.017429980 11.177152  0.4364388
## n.x-s.y      6.5910880 -0.006203128 13.188379  0.0504351
## n.e-s.y      8.0232639  1.425972798 14.620555  0.0051057
## n.m-s.a11    1.7082176 -4.889073499  8.305509  0.9968040
## n.main-s.a11  4.1296296 -2.467661462 10.726921  0.5842230
## n.x-s.a11    6.1408565 -0.456434610 12.738148  0.0916905
## n.e-s.a11    7.5730324  0.975741316 14.170323  0.0111460
## n.main-n.m    2.4214120 -4.175879054  9.018703  0.9683380
## n.x-n.m      4.4326389 -2.164652202 11.029930  0.4839677
## n.e-n.m      5.8648148 -0.732476276 12.462106  0.1282081
## n.x-n.main   2.0112269 -4.586064239  8.608518  0.9902712
## n.e-n.main   3.4434028 -3.153888313 10.040694  0.7944200
## n.e-n.x      1.4321759 -5.165115165  8.029467  0.9990927

```

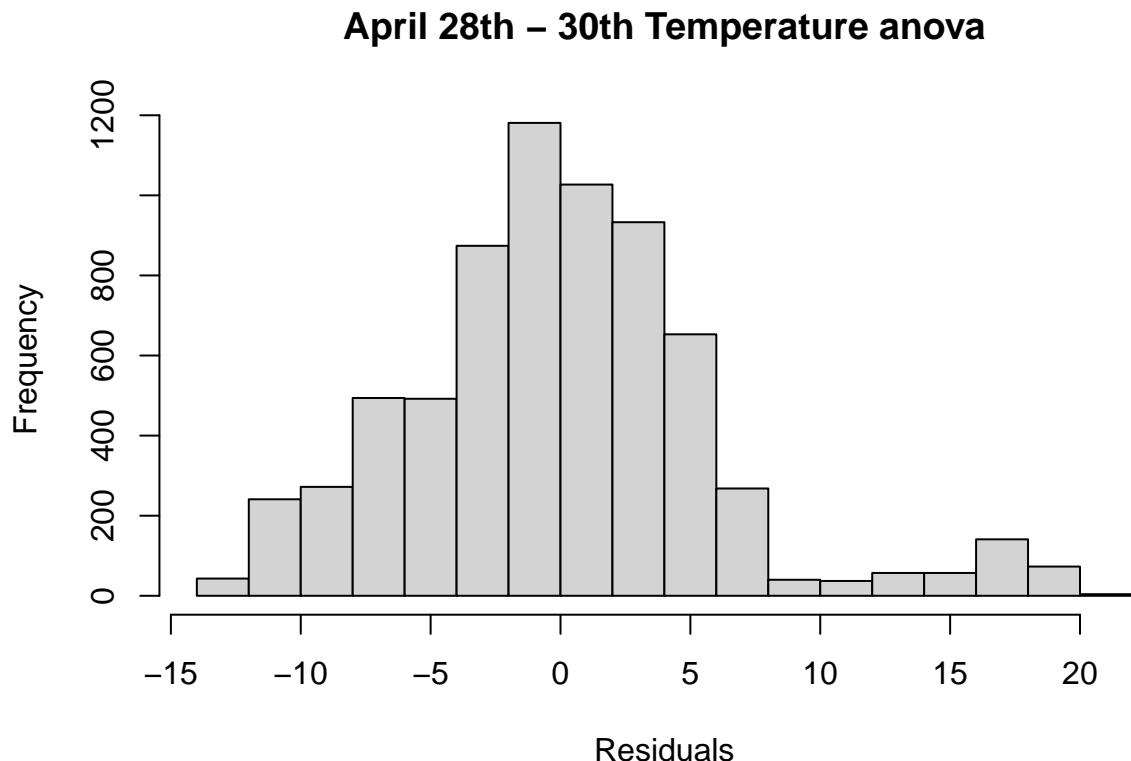
95% family-wise confidence level

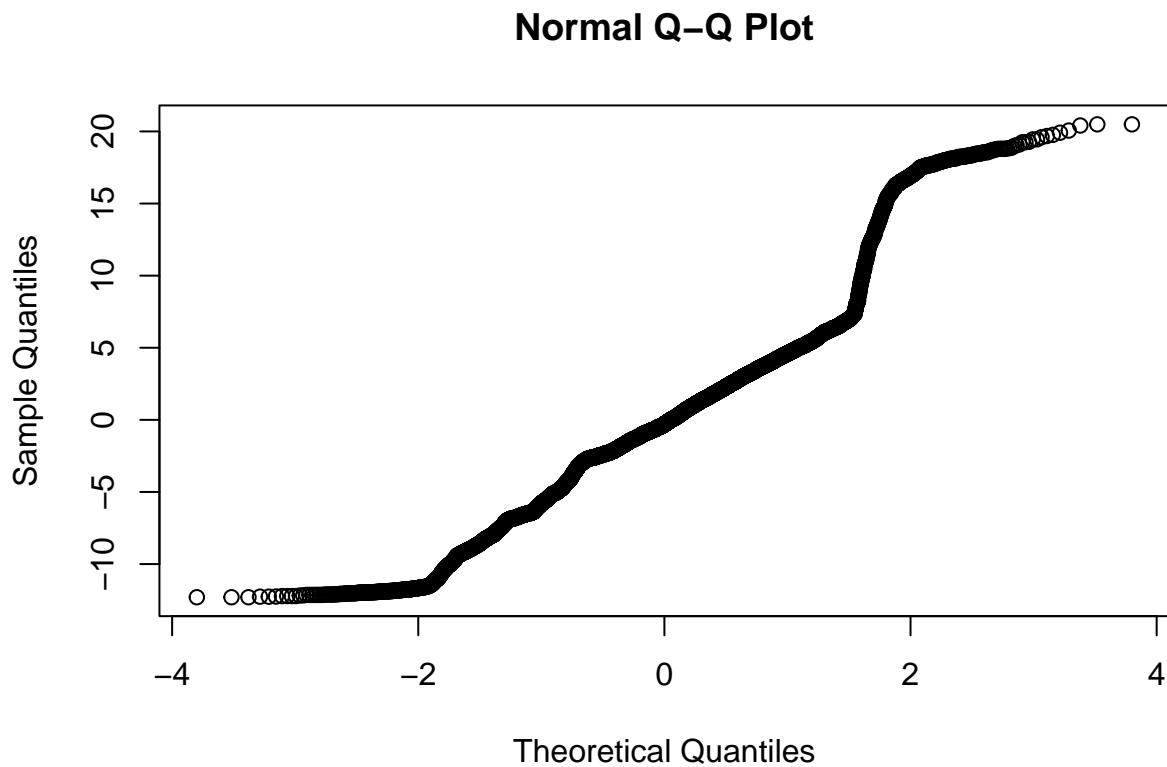


April 28th - 30th

Temperature

```
## Analysis of Variance Table
##
## Response: temp
##           Df Sum Sq Mean Sq F value    Pr(>F)
## site       7 26956  3850.9 111.12 < 2.2e-16 ***
## Residuals 6879 238396     34.7
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-04-28" & date <= "2021-04-30"))
##
## $site
##          diff      lwr      upr   p adj
## s.a16-s.g  0.04534803 -0.8143594 0.9050555 0.9999999
## s.y-s.g    0.21825986 -0.6414476 1.0779673 0.9946022
## s.main-s.g 0.27428074 -0.5854267 1.1339882 0.9789405
## n.m-s.g    3.89904301  3.0385853 4.7595008 0.0000000
## n.main-s.g 4.08674014  3.2270327 4.9464476 0.0000000
## n.e-s.g    4.11209307  3.2516353 4.9725508 0.0000000
## n.x-s.g    4.23906629  3.3786085 5.0995240 0.0000000
## s.y-s.a16   0.17291183 -0.6867956 1.0326193 0.9987644
## s.main-s.a16 0.22893271 -0.6307747 1.0886402 0.9927671
## n.m-s.a16   3.85369498  2.9932372 4.7141527 0.0000000
## n.main-s.a16 4.04139211  3.1816847 4.9010996 0.0000000
## n.e-s.a16   4.06674504  3.2062873 4.9272028 0.0000000
## n.x-s.a16   4.19371827  3.3332605 5.0541760 0.0000000
## s.main-s.y    0.05602088 -0.8036866 0.9157283 0.9999994
## n.m-s.y     3.68078315  2.8203254 4.5412409 0.0000000
## n.main-s.y   3.86848028  3.0087728 4.7281877 0.0000000
## n.e-s.y     3.89383321  3.0333755 4.7542910 0.0000000
## n.x-s.y     4.02080643  3.1603487 4.8812642 0.0000000

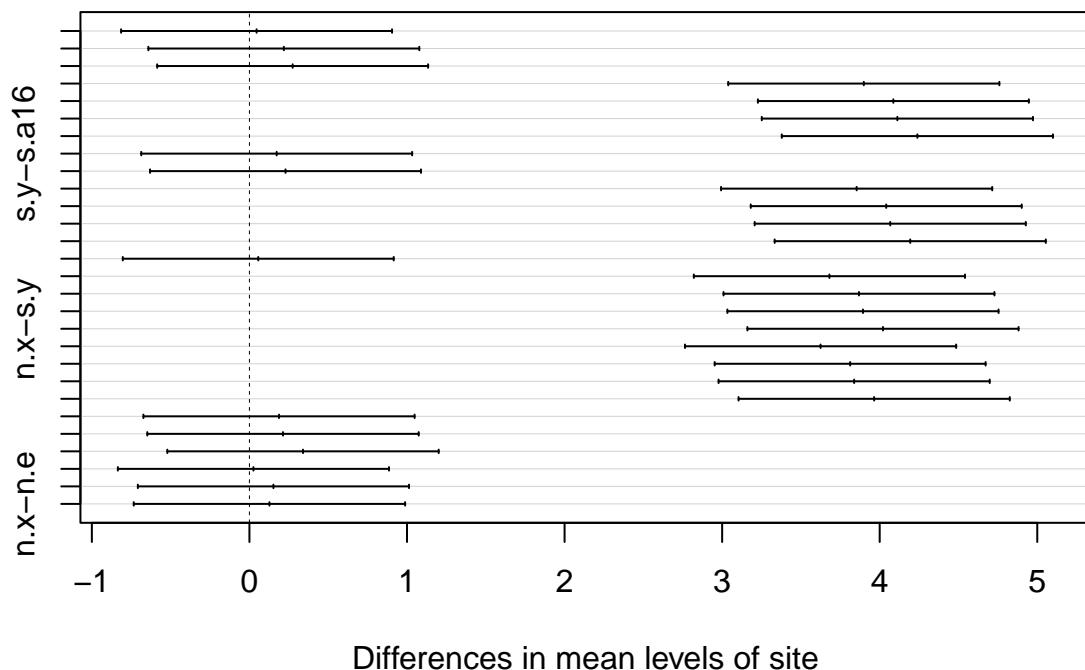
```

```

## n.m-s.main    3.62476227  2.7643045 4.4852200 0.0000000
## n.main-s.main 3.81245940  2.9527519 4.6721669 0.0000000
## n.e-s.main    3.83781233  2.9773546 4.6982701 0.0000000
## n.x-s.main    3.96478555  3.1043278 4.8252433 0.0000000
## n.main-n.m    0.18769713 -0.6727606 1.0481549 0.9979182
## n.e-n.m       0.21305006 -0.6481573 1.0742574 0.9954017
## n.x-n.m       0.34002328 -0.5211841 1.2012307 0.9330227
## n.e-n.main    0.02535293 -0.8351048 0.8858107 1.0000000
## n.x-n.main    0.15232615 -0.7081316 1.0127839 0.9994631
## n.x-n.e       0.12697322 -0.7342342 0.9881806 0.9998410

```

95% family-wise confidence level

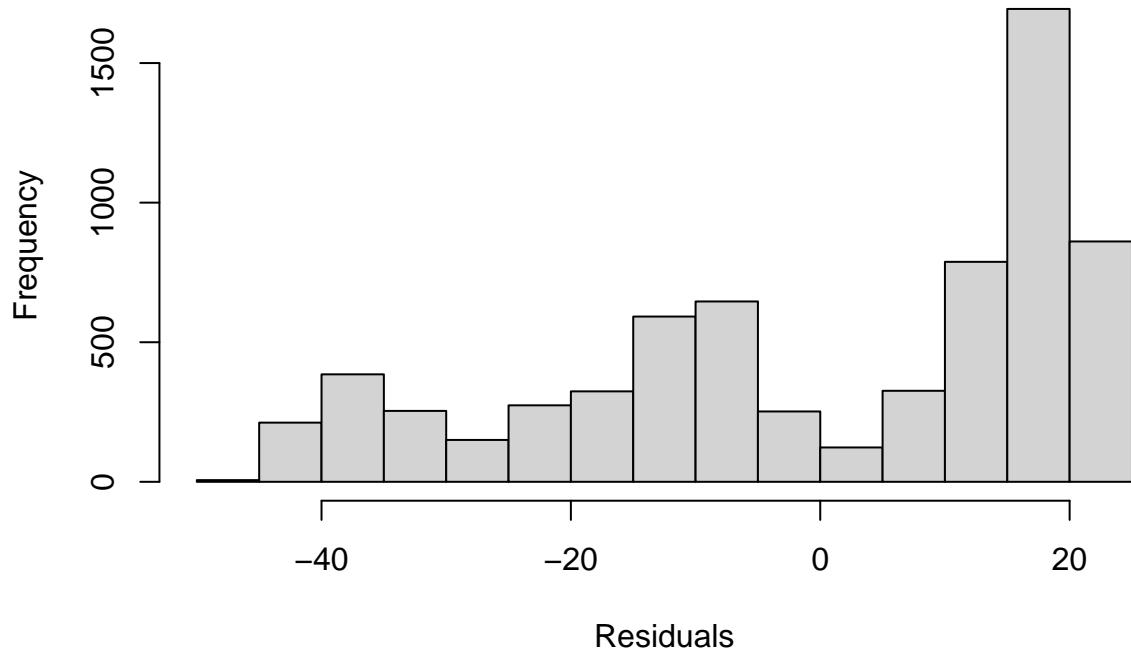


Differences in mean levels of site

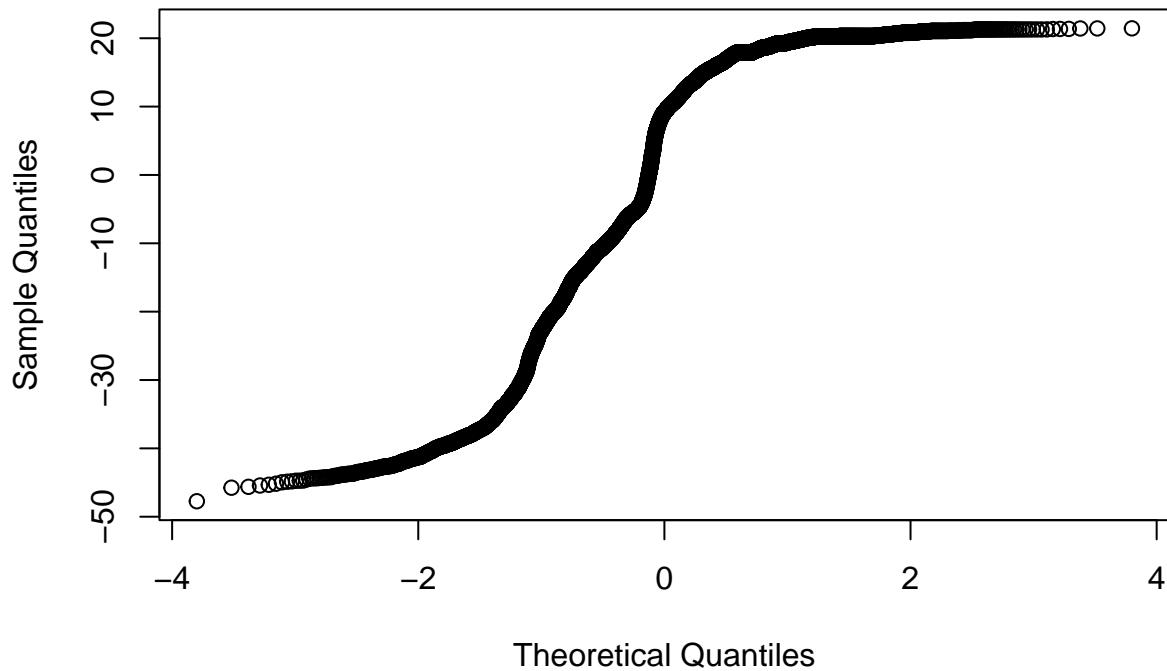
Relative Humidity

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site        7   9726  1389.42   3.4858 0.0009821 ***
## Residuals 6879 2741910   398.59
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 28th – 30th Relative Humidity anova



Normal Q-Q Plot



```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-04-28" & date <= "2021-04-30"))
##
## $site
##          diff      lwr      upr   p adj
## s.a16-n.e  0.07500361 -2.8431430 2.993150 1.0000000
## s.main-n.e  0.23449317 -2.6836534 3.152640 0.9999975
## s.g-n.e    0.45279943 -2.4653471 3.370946 0.9997762
## s.y-n.e    1.20539804 -1.7127485 4.123545 0.9159507
## n.main-n.e 1.24829827 -1.6698483 4.166445 0.9003114
## n.m-n.e    2.26444703 -0.6562418 5.185136 0.2663485
## n.x-n.e    3.65146682  0.7307780 6.572156 0.0037852
## s.main-s.a16 0.15948956 -2.7561125 3.075092 0.9999998
## s.g-s.a16   0.377779582 -2.5378062 3.293398 0.9999335
## s.y-s.a16   1.13039443 -1.7852076 4.045996 0.9389946
## n.main-s.a16 1.17329466 -1.7423074 4.088897 0.9262254
## n.m-s.a16   2.18944343 -0.7287031 5.107590 0.3077260
## n.x-s.a16   3.57646322  0.6583167 6.494610 0.0050308
## s.g-s.main   0.21830626 -2.6972958 3.133908 0.9999985
## s.y-s.main   0.97090487 -1.9446972 3.886507 0.9731561
## n.main-s.main 1.01380510 -1.9017969 3.929407 0.9658695
## n.m-s.main   2.02995387 -0.8881927 4.948100 0.4090126
## n.x-s.main   3.41697366  0.4988271 6.335120 0.0092456

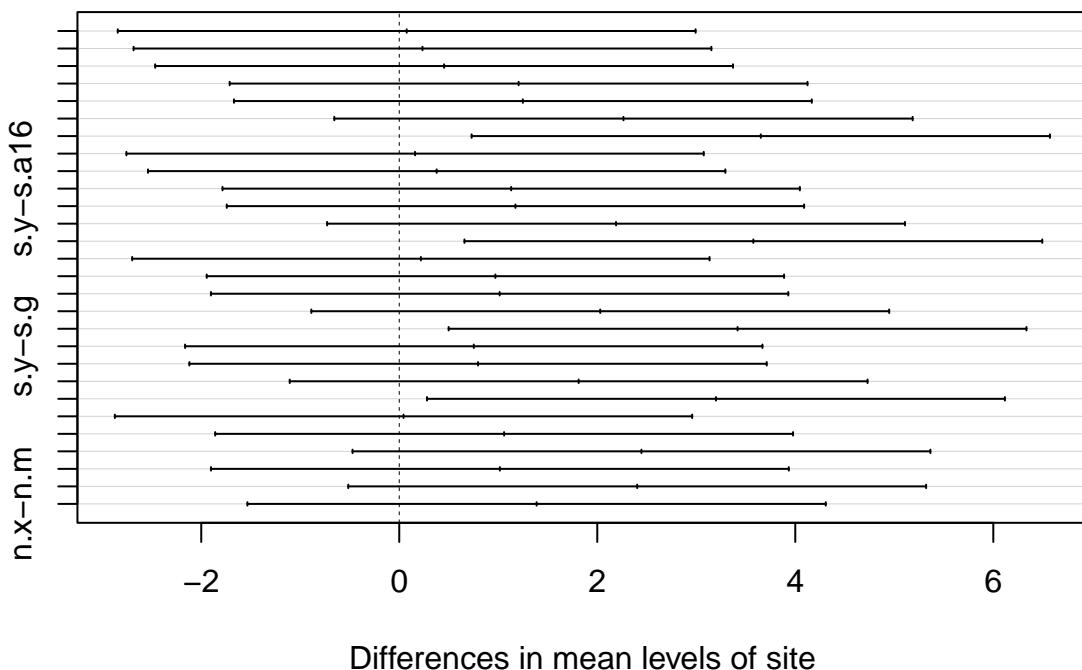
```

```

## s.y-s.g      0.75259861 -2.1630034 3.668201 0.9940212
## n.main-s.g  0.79549884 -2.1201032 3.711101 0.9916179
## n.m-s.g    1.81164760 -1.1064990 4.729794 0.5632649
## n.x-s.g    3.19866739  0.2805208 6.116814 0.0201666
## n.main-s.y  0.04290023 -2.8727018 2.958502 1.0000000
## n.m-s.y    1.05904899 -1.8590976 3.977196 0.9569337
## n.x-s.y    2.44606878 -0.4720778 5.364215 0.1783039
## n.m-n.main 1.01614876 -1.9019978 3.934295 0.9655990
## n.x-n.main 2.40316855 -0.5149780 5.321315 0.1967843
## n.x-n.m   1.38701979 -1.5336691 4.307709 0.8387404

```

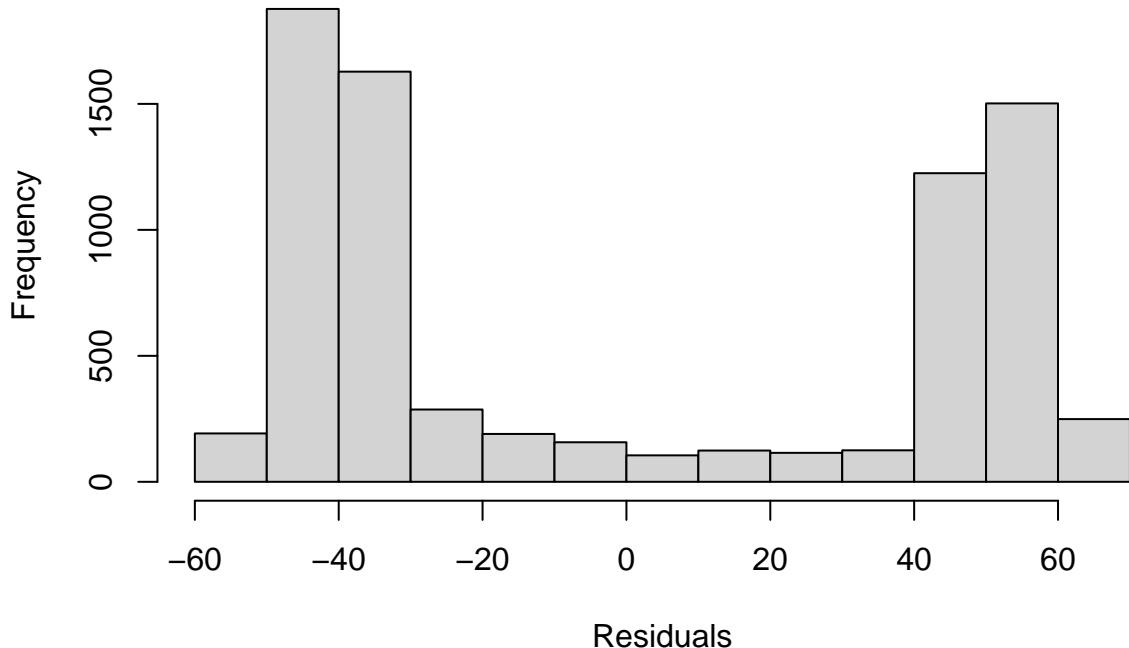
95% family-wise confidence level

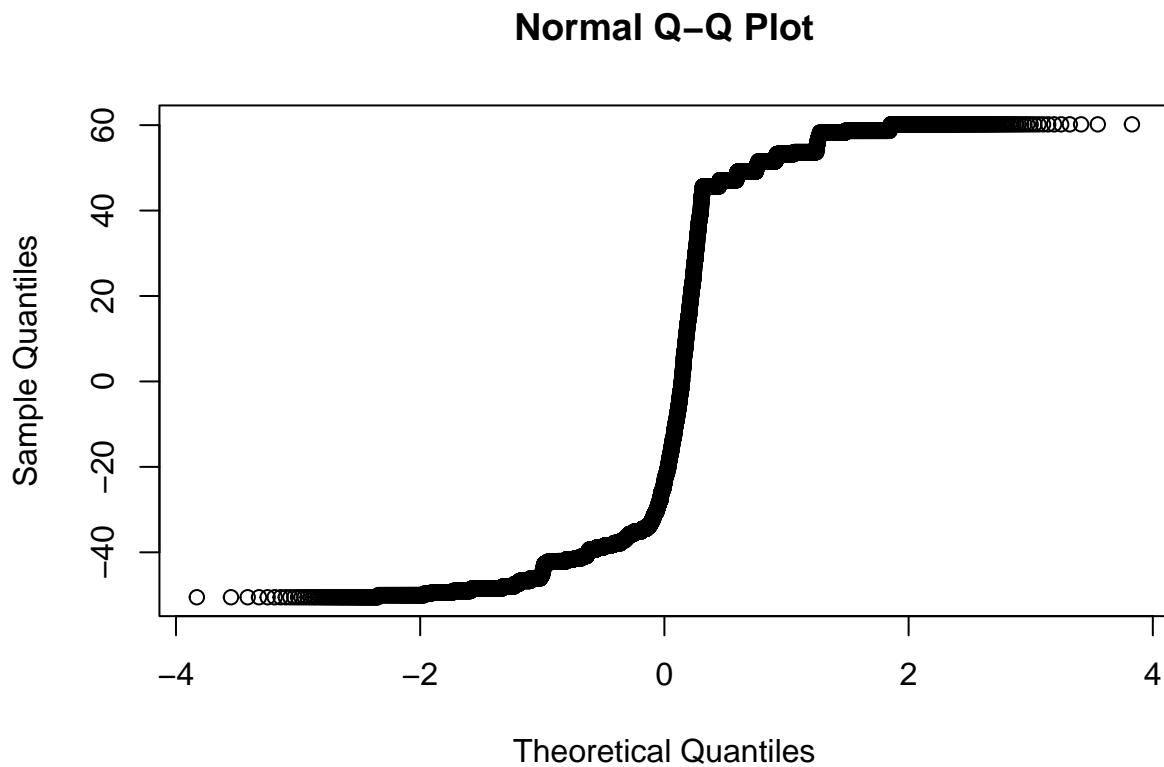


Leaf Wetness

```
## Analysis of Variance Table
##
## Response: wet
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site        8 181206 22650.8 10.808 3.052e-15 ***
## Residuals 6950 14565276 2095.7
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 28th – 30th Leaf Wetness anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-04-28" & date <= "2021-04-30"))
##
## $site
##          diff      lwr      upr   p adj
## s.g-n.x 40.67695571 22.6623156 58.691596 0.0000000
## s.main-n.x 41.83913668 23.8244965 59.853777 0.0000000
## s.y-n.x 43.02718773 25.0125476 61.041828 0.0000000
## s.a16-n.x 43.15735014 25.1427100 61.171990 0.0000000
## s.a11-n.x 43.23090002 25.2162599 61.245540 0.0000000
## n.main-n.x 44.56048239 26.5458422 62.575123 0.0000000
## n.m-n.x 44.68911264 26.6722039 62.706021 0.0000000
## n.e-n.x 50.53806404 32.5226694 68.553459 0.0000000
## s.main-s.g 1.16218097 -5.6796152 8.003977 0.9998533
## s.y-s.g 2.35023202 -4.4915642 9.192028 0.9789578
## s.a16-s.g 2.48039443 -4.3614018 9.322191 0.9706164
## s.a11-s.g 2.55394432 -4.2878519 9.395741 0.9649316
## n.main-s.g 3.88352668 -2.9582695 10.725323 0.7079649
## n.m-s.g 4.01215694 -2.8356103 10.859924 0.6702905
## n.e-s.g 9.86110833 3.0173258 16.704891 0.0002720
## s.y-s.main 1.18805104 -5.6537452 8.029847 0.9998268
## s.a16-s.main 1.31821346 -5.5235827 8.160010 0.9996228
## s.a11-s.main 1.39176334 -5.4500329 8.233560 0.9994363

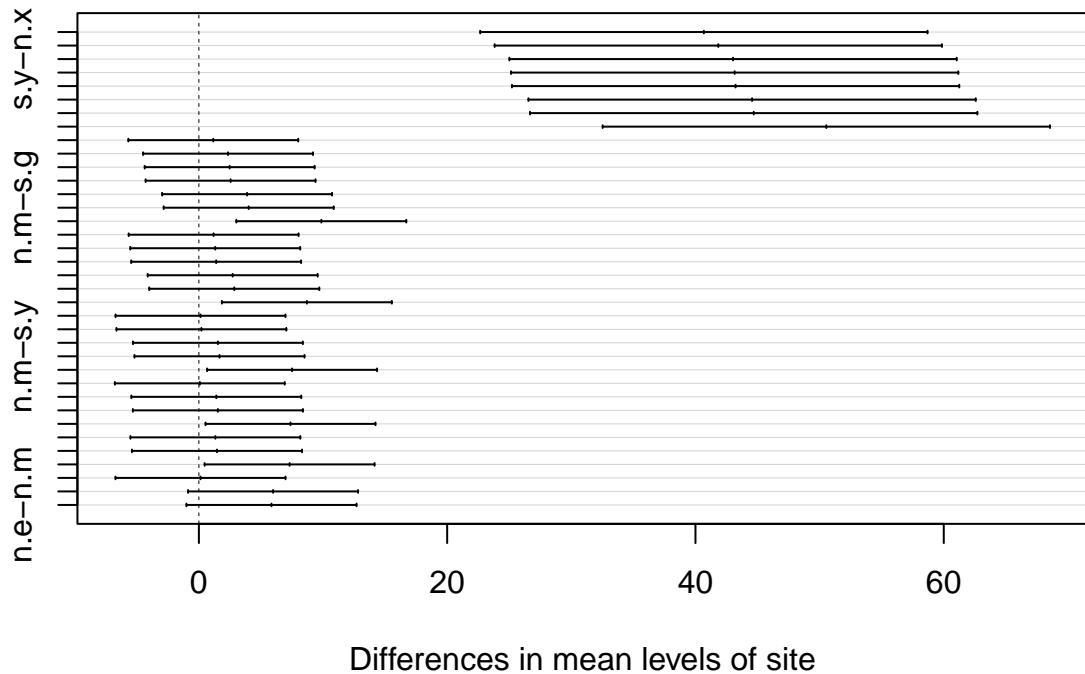
```

```

## n.main-s.main 2.72134571 -4.1204505 9.563142 0.9490581
## n.m-s.main    2.84997596 -3.9977913 9.697743 0.9341494
## n.e-s.main    8.69892735  1.8551449 15.542710 0.0026225
## s.a16-s.y     0.13016241 -6.7116338 6.971959 1.0000000
## s.a11-s.y     0.20371230 -6.6380839 7.045509 1.0000000
## n.main-s.y    1.53329466 -5.3085015 8.375091 0.9988565
## n.m-s.y      1.66192492 -5.1858423 8.509692 0.9979745
## n.e-s.y      7.51087631  0.6670938 14.354659 0.0191643
## s.a11-s.a16   0.07354988 -6.7682463 6.915346 1.0000000
## n.main-s.a16  1.40313225 -5.4386640 8.244928 0.9994015
## n.m-s.a16    1.53176250 -5.3160047 8.379530 0.9988718
## n.e-s.a16    7.38071389  0.5369314 14.224496 0.0233232
## n.main-s.a11  1.32958237 -5.5122138 8.171379 0.9995979
## n.m-s.a11    1.45821262 -5.3895546 8.305980 0.9992113
## n.e-s.a11    7.30716401  0.4633815 14.150947 0.0260096
## n.m-n.main    0.12863025 -6.7191370 6.976397 1.0000000
## n.e-n.main    5.97758164 -0.8662009 12.821364 0.1442949
## n.e-n.m      5.84895139 -1.0008004 12.698703 0.1666147

```

95% family-wise confidence level

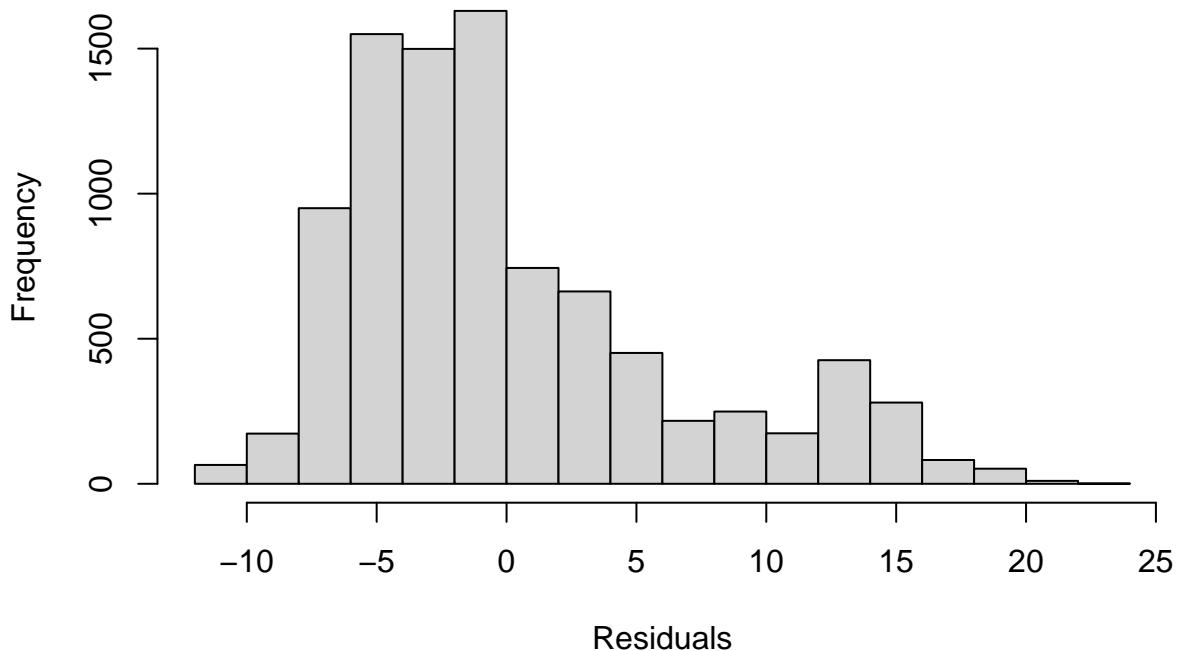


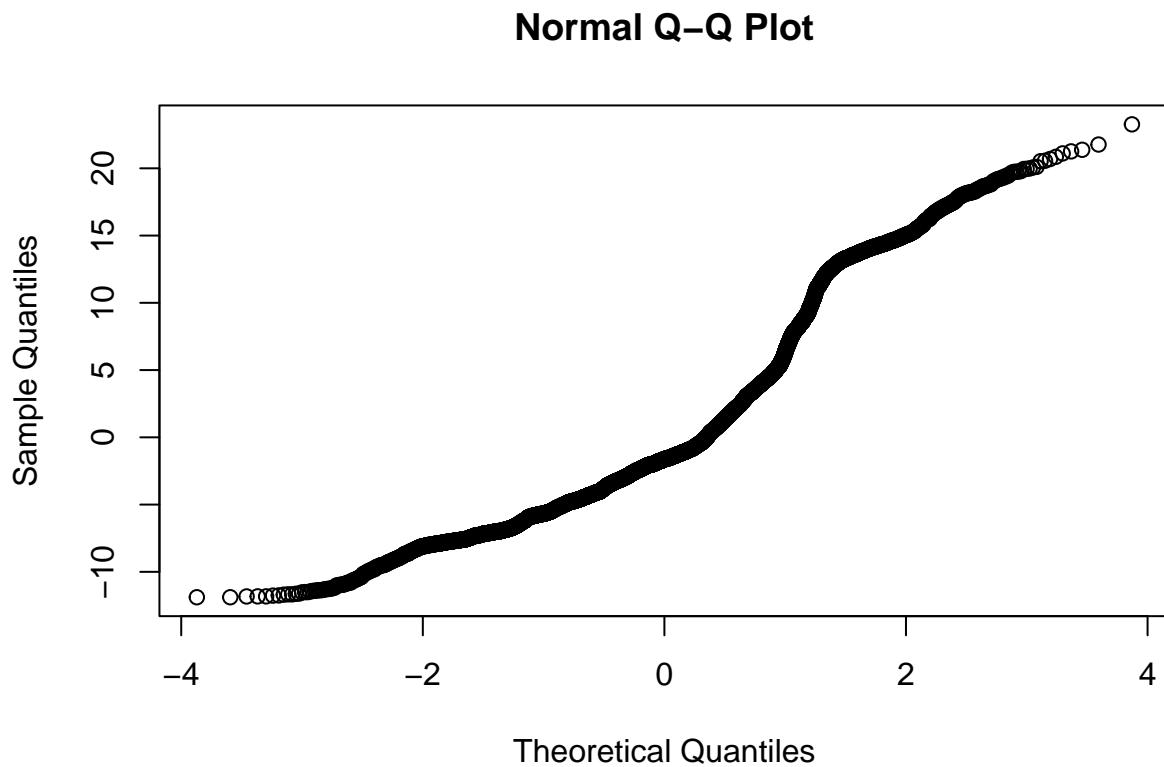
March 2nd - 5th

Temperature

```
## Analysis of Variance Table
##
## Response: temp
##           Df Sum Sq Mean Sq F value    Pr(>F)
## site        7 1307   186.769   4.604 3.761e-05 ***
## Residuals 9208 373539   40.567
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

May 2nd – 5th Temperature anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-05-02" & date <= "2021-05-05"))
##
## $site
##          diff      lwr      upr   p adj
## s.a16-s.g  0.17509549 -0.62943551 0.9796265 0.9979500
## s.main-s.g  0.30717882 -0.49735217 1.1117098 0.9436874
## s.y-s.g    0.43624132 -0.36828967 1.2407723 0.7234840
## n.m-s.g    0.71370660 -0.09082439 1.5182376 0.1258333
## n.main-s.g  0.81767361  0.01314262 1.6222046 0.0431809
## n.e-s.g    0.88629340  0.08176241 1.6908244 0.0190795
## n.x-s.g    1.19061632  0.38608533 1.9951473 0.0001972
## s.main-s.a16 0.13208333 -0.67244766 0.9366143 0.9996742
## s.y-s.a16   0.261114583 -0.543338516 1.0656768 0.9767787
## n.m-s.a16   0.538611111 -0.26591988 1.3431421 0.4617332
## n.main-s.a16 0.64257813 -0.16195287 1.4471091 0.2309429
## n.e-s.a16   0.711119792 -0.093333308 1.5157289 0.1287850
## n.x-s.a16   1.01552083  0.21098984 1.8200518 0.0032828
## s.y-s.main   0.12906250 -0.67546849 0.9335935 0.9997207
## n.m-s.main   0.40652778 -0.39800321 1.2110588 0.7902929
## n.main-s.main 0.51049479 -0.29403620 1.3150258 0.5344971
## n.e-s.main   0.57911458 -0.22541641 1.3836456 0.3625940
## n.x-s.main   0.88343750  0.07890651 1.6879685 0.0197724

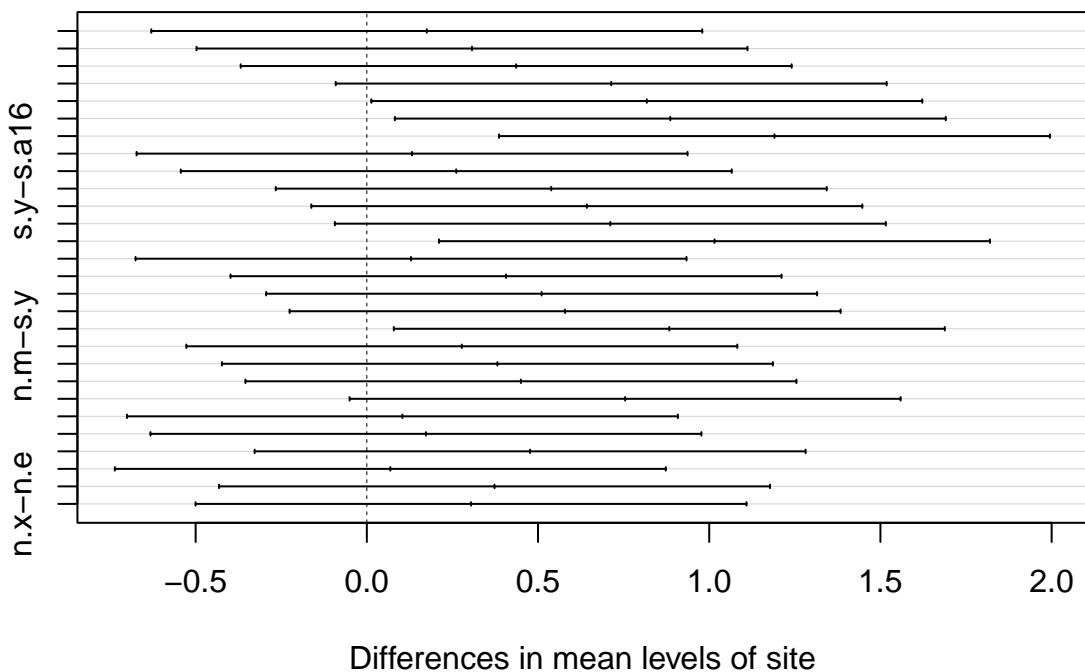
```

```

## n.m-s.y      0.27746528 -0.52706571 1.0819963 0.9673952
## n.main-s.y   0.38143229 -0.42309870 1.1859633 0.8399764
## n.e-s.y     0.45005208 -0.35447891 1.2545831 0.6900709
## n.x-s.y     0.75437500 -0.05015599 1.5589060 0.0849063
## n.main-n.m   0.10396701 -0.70056398 0.9084980 0.9999347
## n.e-n.m     0.17258681 -0.63194419 0.9771178 0.9981306
## n.x-n.m     0.47690972 -0.32762127 1.2814407 0.6221281
## n.e-n.main   0.06861979 -0.73591120 0.8731508 0.9999962
## n.x-n.main   0.37294271 -0.43158828 1.1774737 0.8551895
## n.x-n.e      0.30432292 -0.50020808 1.1088539 0.9463726

```

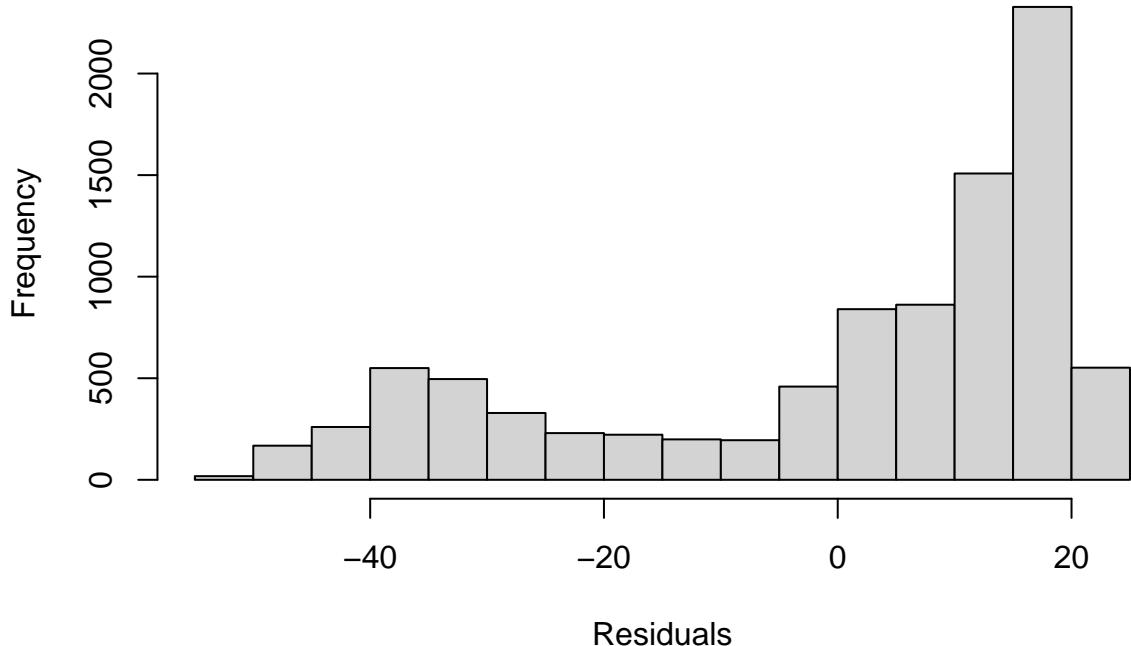
95% family-wise confidence level

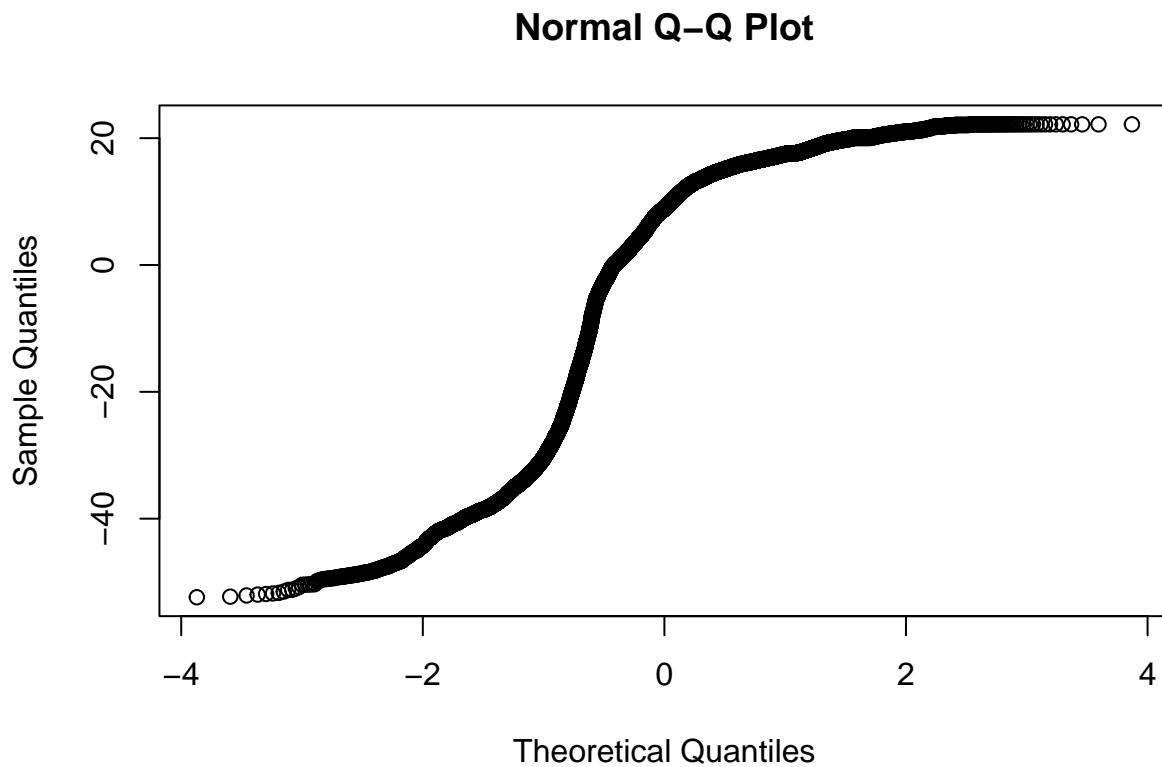


Relative Humidity

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site        7  38580  5511.4   12.931 < 2.2e-16 ***
## Residuals  9208 3924656   426.2
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

May 2nd – 5th Relative Humidity anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-05-02" & date <= "2021-05-05"))
##
## $site
##          diff      lwr      upr   p adj
## n.main-n.e 1.2078472 -1.39996206 3.815656 0.8557320
## n.m-n.e   1.9614931 -0.64631622 4.569302 0.3045678
## n.x-n.e   3.3394705  0.73166121 5.947280 0.0026393
## s.a16-n.e  4.6256076  2.01779836 7.233417 0.0000022
## s.g-n.e   5.2903906  2.68258135 7.898200 0.0000000
## s.main-n.e 5.4148785  2.80706919 8.022688 0.0000000
## s.y-n.e   5.8380208  3.23021156 8.445830 0.0000000
## n.m-n.main 0.7536458 -1.85416344 3.361455 0.9881766
## n.x-n.main 2.1316233 -0.47618601 4.739433 0.2049008
## s.a16-n.main 3.4177604  0.80995114 6.025570 0.0018319
## s.g-n.main  4.0825434  1.47473413 6.690353 0.0000575
## s.main-n.main 4.2070313  1.59922197 6.814841 0.0000280
## s.y-n.main  4.6301736  2.02236433 7.237983 0.0000021
## n.x-n.m    1.3779774 -1.22983185 3.985787 0.7493887
## s.a16-n.m   2.6641146  0.05630531 5.271924 0.0411633
## s.g-n.m    3.3288976  0.72108829 5.936707 0.0027708
## s.main-n.m  3.4533854  0.84557614 6.061195 0.0015467
## s.y-n.m    3.8765278  1.26871850 6.484337 0.0001797

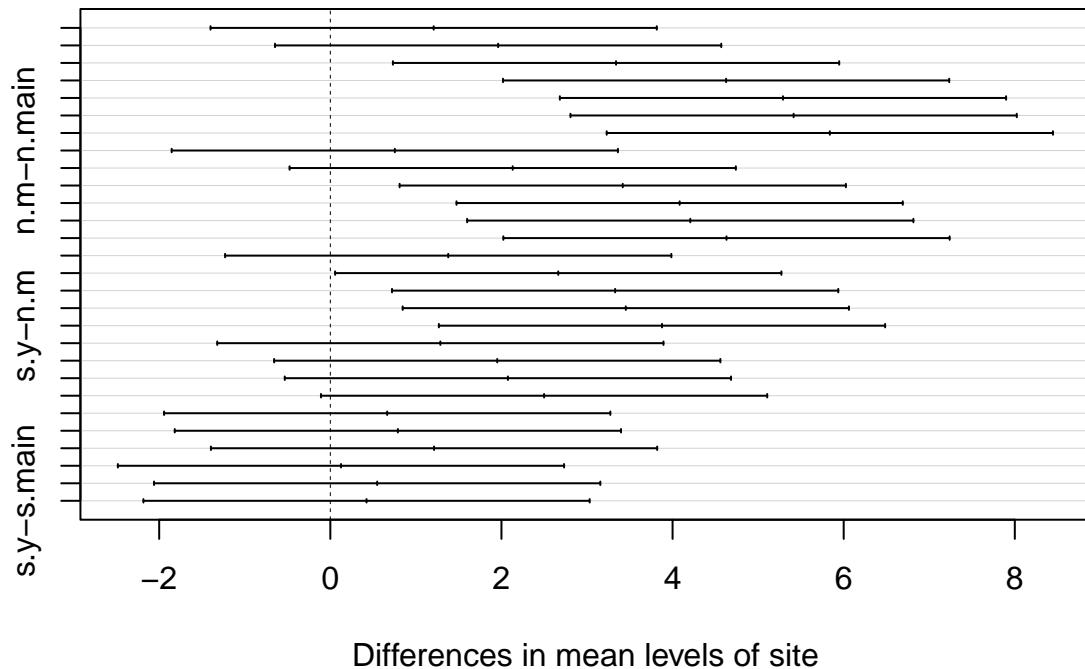
```

```

## s.a16-n.x      1.2861372 -1.32167212 3.893946 0.8103876
## s.g-n.x       1.9509201 -0.65688914 4.558729 0.3115517
## s.main-n.x    2.0754080 -0.53240129 4.683217 0.2351014
## s.y-n.x       2.4985503 -0.10925893 5.106360 0.0717510
## s.g-s.a16     0.6647830 -1.94302629 3.272592 0.9944679
## s.main-s.a16  0.7892708 -1.81853844 3.397080 0.9844813
## s.y-s.a16     1.2124132 -1.39539608 3.820222 0.8532712
## s.main-s.g    0.1244878 -2.48332143 2.732297 0.9999999
## s.y-s.g       0.5476302 -2.06017907 3.155439 0.9983693
## s.y-s.main    0.4231424 -2.18466692 3.030952 0.9996987

```

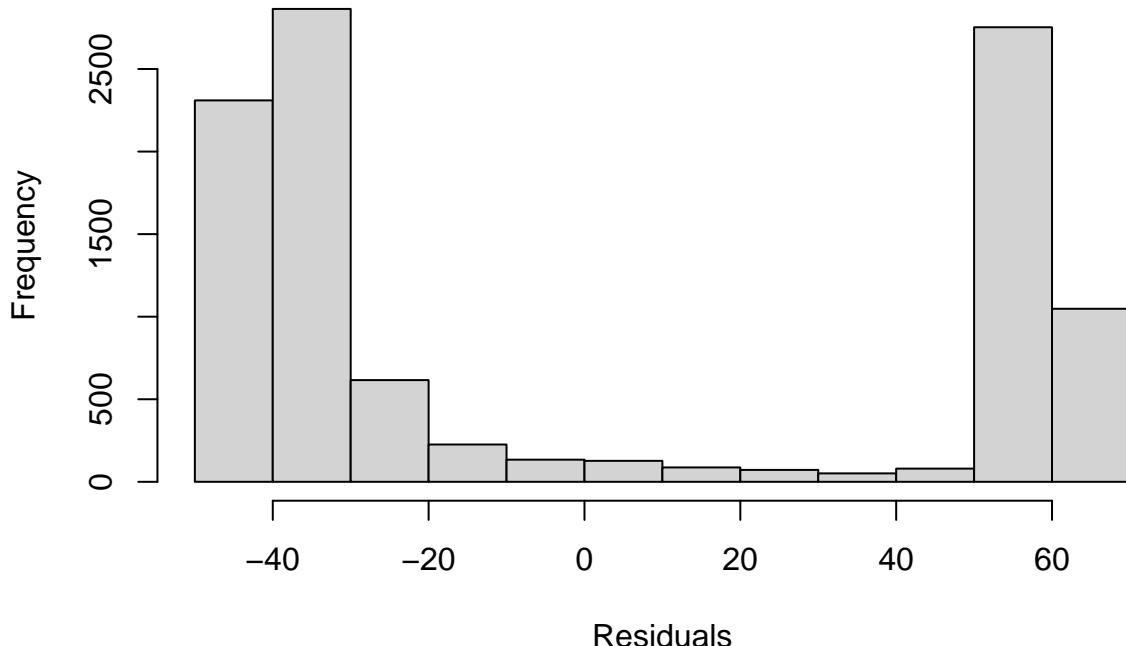
95% family-wise confidence level

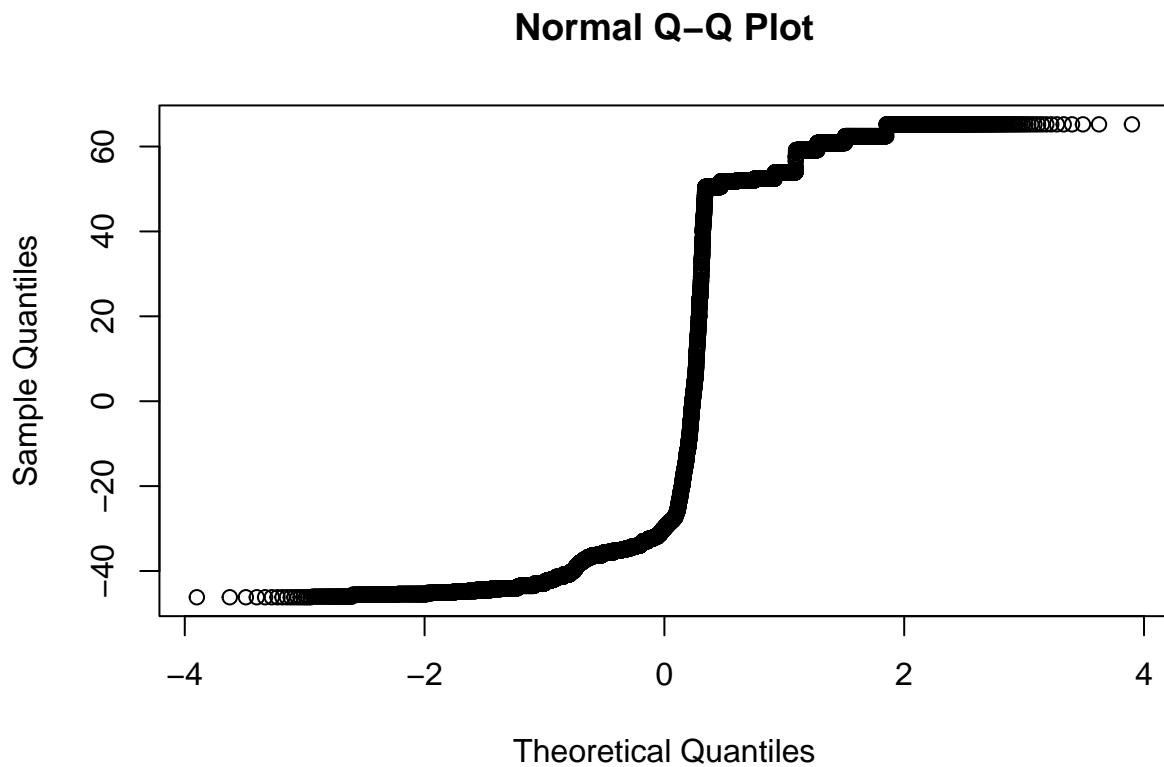


Leaf Wetness

```
## Analysis of Variance Table
##
## Response: wet
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site        8  275464   34433   17.36 < 2.2e-16 ***
## Residuals 10359 20546391    1983
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

May 2nd – 5th Leaf Wetness anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-05-02" & date <= "2021-05-05"))
##
## $site
##          diff      lwr      upr   p adj
## n.main-n.m 2.7819444 -2.9750273 8.538916 0.8563687
## n.x-n.m    4.3815972 -1.3753745 10.138569 0.3056982
## n.e-n.m    6.0689236  0.3119519 11.825895 0.0297681
## s.g-n.m   11.2966146  5.5396429 17.053586 0.0000000
## s.main-n.m 12.8180556  7.0610838 18.575027 0.0000000
## s.a16-n.m  13.2059028  7.4489311 18.962875 0.0000000
## s.a11-n.m  13.4222222  7.6652505 19.179194 0.0000000
## s.y-n.m   14.7456597  8.9886880 20.502631 0.0000000
## n.x-n.main 1.5996528 -4.1573189  7.356625 0.9947950
## n.e-n.main 3.2869792 -2.4699926  9.043951 0.7013204
## s.g-n.main 8.5146701  2.7576984 14.271642 0.0001564
## s.main-n.main 10.0361111  4.2791394 15.793083 0.0000023
## s.a16-n.main 10.4239583  4.6669866 16.180930 0.0000007
## s.a11-n.main 10.6402778  4.8833061 16.397250 0.0000004
## s.y-n.main 11.9637153  6.2067436 17.720687 0.0000000
## n.e-n.x   1.6873264 -4.0696453  7.444298 0.9925239
## s.g-n.x   6.9150174  1.1580456 12.671989 0.0060851
## s.main-n.x 8.4364583  2.6794866 14.193430 0.0001906

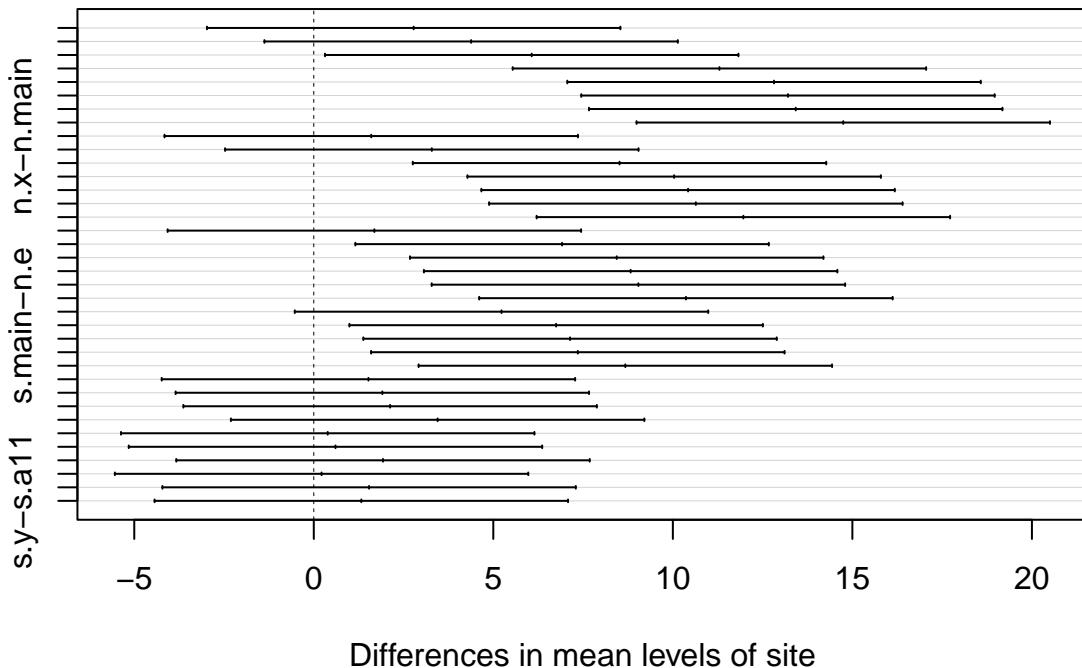
```

```

## s.a16-n.x      8.8243056  3.0673338 14.581277 0.0000702
## s.a11-n.x     9.0406250  3.2836533 14.797597 0.0000394
## s.y-n.x      10.3640625  4.6070908 16.121034 0.0000009
## s.g-n.e       5.2276910 -0.5292808 10.984663 0.1103709
## s.main-n.e    6.7491319  0.9921602 12.506104 0.0084756
## s.a16-n.e     7.1369792  1.3800074 12.893951 0.0038486
## s.a11-n.e     7.3532986  1.5963269 13.110270 0.0024236
## s.y-n.e       8.6767361  2.9197644 14.433708 0.0001032
## s.main-s.g    1.5214410 -4.2355308 7.278413 0.9963169
## s.a16-s.g     1.9092882 -3.8476835 7.666260 0.9831752
## s.a11-s.g     2.1256076 -3.6313641 7.882579 0.9671961
## s.y-s.g       3.4490451 -2.3079266 9.206017 0.6424638
## s.a16-s.main   0.3878472 -5.3691245 6.144819 0.9999999
## s.a11-s.main   0.6041667 -5.1528051 6.361138 0.9999964
## s.y-s.main    1.9276042 -3.8293676 7.684576 0.9821190
## s.a11-s.a16   0.2163194 -5.5406523 5.973291 1.0000000
## s.y-s.a16    1.5397569 -4.2172148 7.296729 0.9959980
## s.y-s.a11    1.3234375 -4.4335342 7.080409 0.9986275

```

95% family-wise confidence level

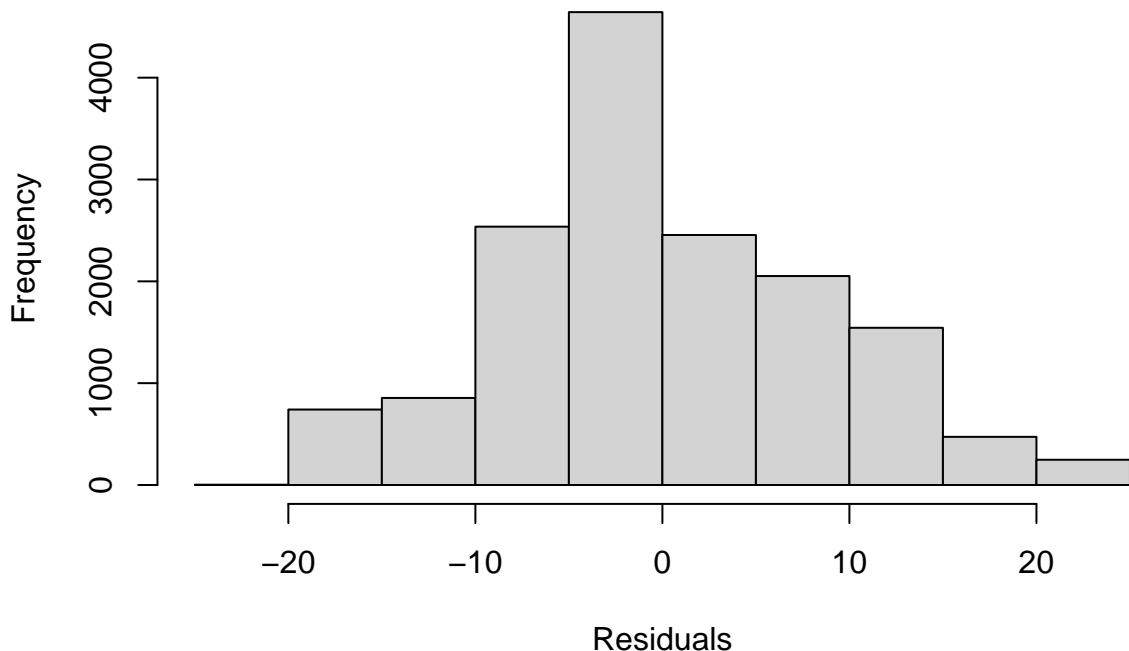


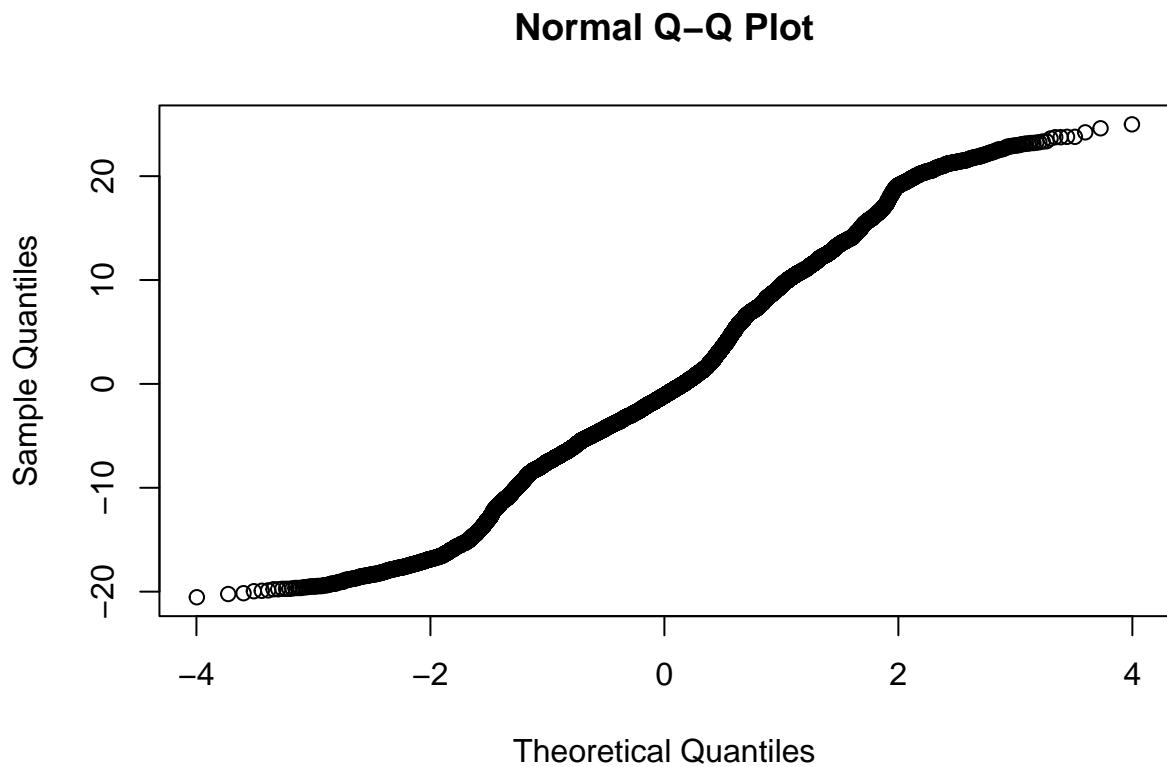
By Month

March 2021 Temperature by site

```
## Analysis of Variance Table
##
## Response: temp
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site        8   27465  3433.1  47.326 < 2.2e-16 ***
## Residuals 15543 1127513     72.5
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 2021 temperature anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-03-01" & date <= "2021-03-31"))
##
## $site
##          diff      lwr      upr   p adj
## s.a16-s.g  0.2463889 -0.65249185 1.145270 0.9952627
## s.y-s.g    0.4397801 -0.45910065 1.338661 0.8475846
## s.a11-s.g   0.6937963 -0.20508444 1.592677 0.2868948
## s.main-s.g  1.8846644  0.98578361 2.783545 0.0000000
## n.m-s.g    2.4563831  1.55750236 3.355264 0.0000000
## n.e-s.g    2.8596759  1.96079519 3.758557 0.0000000
## n.x-s.g    3.2108970  2.31201625 4.109778 0.0000000
## n.main-s.g  3.7152720  2.81639125 4.614153 0.0000000
## s.y-s.a16   0.1933912 -0.70548954 1.092272 0.9991515
## s.a11-s.a16  0.4474074 -0.45147333 1.346288 0.8346228
## s.main-s.a16 1.6382755  0.73939472 2.537156 0.0000006
## n.m-s.a16   2.2099942  1.31111347 3.108875 0.0000000
## n.e-s.a16   2.6132870  1.71440630 3.512168 0.0000000
## n.x-s.a16   2.9645081  2.06562736 3.863389 0.0000000
## n.main-s.a16 3.4688831  2.57000236 4.367764 0.0000000
## s.a11-s.y    0.2540162 -0.64486454 1.152897 0.9941637
## s.main-s.y    1.4448843  0.54600352 2.343765 0.0000220
## n.m-s.y     2.0166030  1.11772227 2.915484 0.0000000

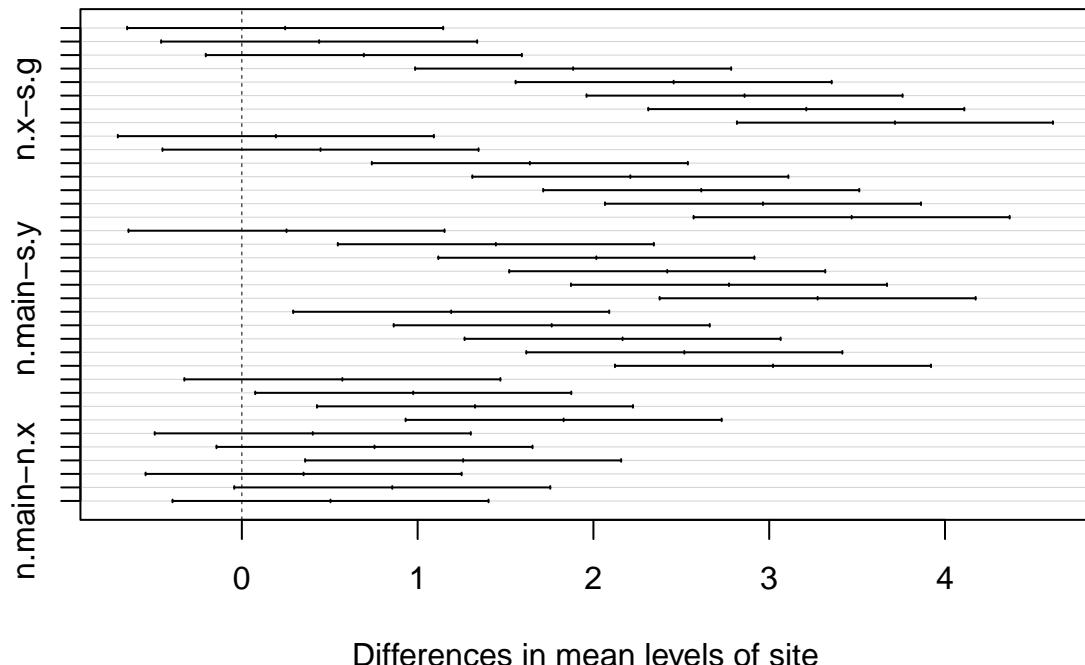
```

```

## n.e-s.y      2.4198958  1.52101509 3.318777 0.0000000
## n.x-s.y      2.7711169  1.87223616 3.669998 0.0000000
## n.main-s.y    3.2754919  2.37661116 4.174373 0.0000000
## s.main-s.a11 1.1908681  0.29198732 2.089749 0.0013189
## n.m-s.a11    1.7625868  0.86370607 2.661468 0.0000001
## n.e-s.a11    2.1658796  1.26699889 3.064760 0.0000000
## n.x-s.a11    2.5171007  1.61821995 3.415981 0.0000000
## n.main-s.a11 3.0214757  2.12259495 3.920356 0.0000000
## n.m-s.main   0.5717188  -0.32716199 1.470599 0.5623437
## n.e-s.main   0.9750116  0.07613083 1.873892 0.0218684
## n.x-s.main   1.3262326  0.42735190 2.225113 0.0001645
## n.main-s.main 1.8306076  0.93172690 2.729488 0.0000000
## n.e-n.m      0.4032928  -0.49558792 1.302174 0.9012956
## n.x-n.m      0.7545139  -0.14436685 1.653395 0.1848020
## n.main-n.m   1.2588889  0.36000815 2.157770 0.0004772
## n.x-n.e      0.3512211  -0.54765968 1.250102 0.9541162
## n.main-n.e   0.8555961  -0.04328468 1.754477 0.0767838
## n.main-n.x   0.5043750  -0.39450574 1.403256 0.7212050

```

95% family-wise confidence level

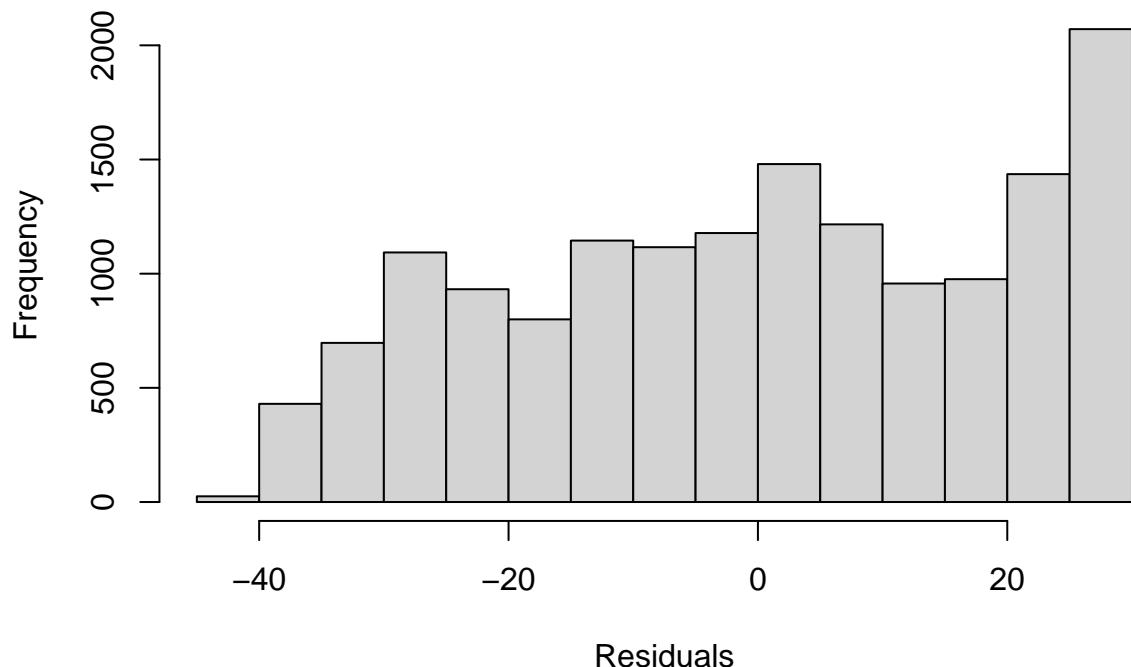


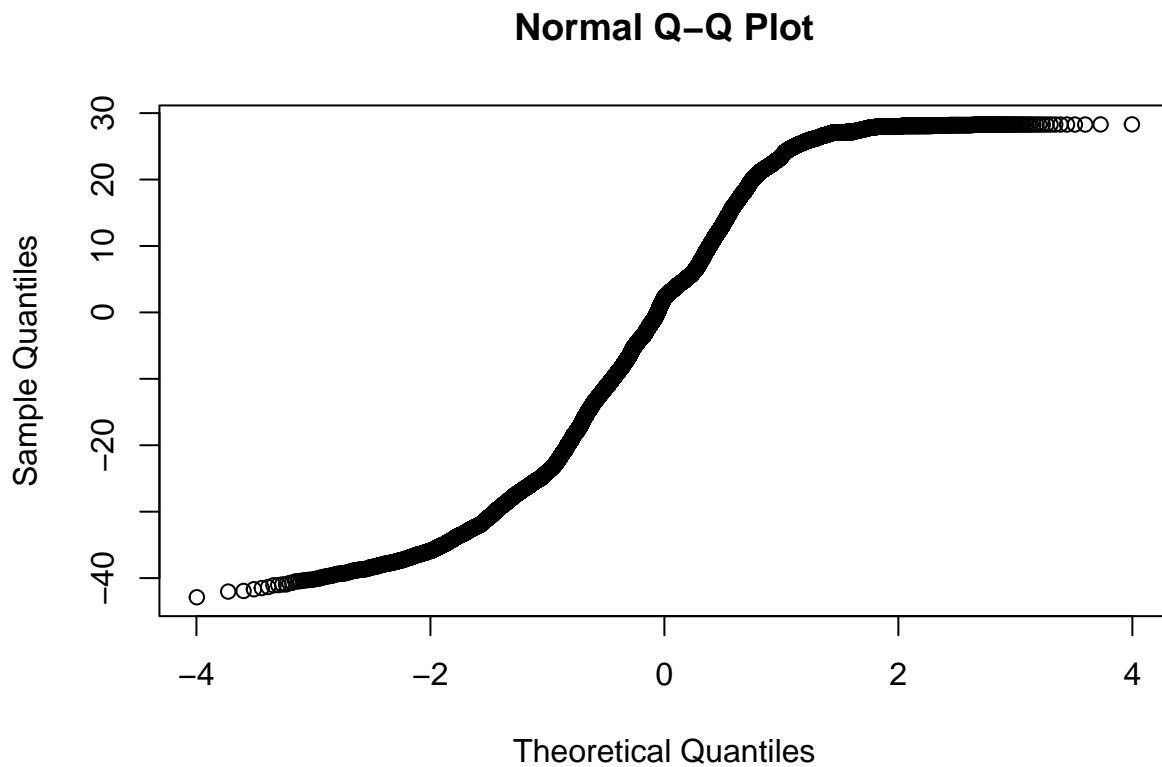
Differences in mean levels of site

March 2021 Relative Humidity by Site

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site          8  13849  1731.10  4.5403 1.556e-05 ***
## Residuals 15543 5926158   381.28
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 2021 Relative humidity anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-03-01" & date <= "2021-03-31"))
##
## $site
##          diff      lwr      upr   p adj
## n.e-s.a11 1.39280093 -0.66796178 3.453564 0.4755664
## s.a16-s.a11 1.45238426 -0.60837845 3.513147 0.4145966
## s.main-s.a11 2.08734375  0.02658104 4.148106 0.0443431
## s.g-s.a11  2.17195023  0.11118752 4.232713 0.0298335
## n.main-s.a11 2.29903356  0.23827085 4.359796 0.0158139
## s.y-s.a11  2.43466435  0.37390164 4.495427 0.0076378
## n.m-s.a11  3.20451389  1.14375118 5.265277 0.0000499
## n.x-s.a11  3.26079282  1.20003011 5.321556 0.0000326
## s.a16-n.e  0.05958333 -2.00117938 2.120346 1.0000000
## s.main-n.e 0.69454282 -1.36621989 2.755306 0.9813707
## s.g-n.e   0.77914931 -1.28161340 2.839912 0.9622017
## n.main-n.e 0.90623264 -1.15453007 2.966995 0.9112079
## s.y-n.e   1.04186343 -1.01889928 3.102626 0.8221478
## n.m-n.e   1.81171296 -0.24904975 3.872476 0.1382603
## n.x-n.e   1.86799190 -0.19277081 3.928755 0.1118082
## s.main-s.a16 0.63495949 -1.42580322 2.695722 0.9895764
## s.g-s.a16  0.71956597 -1.34119674 2.780329 0.9767271
## n.main-s.a16 0.84664931 -1.21411340 2.907412 0.9388283

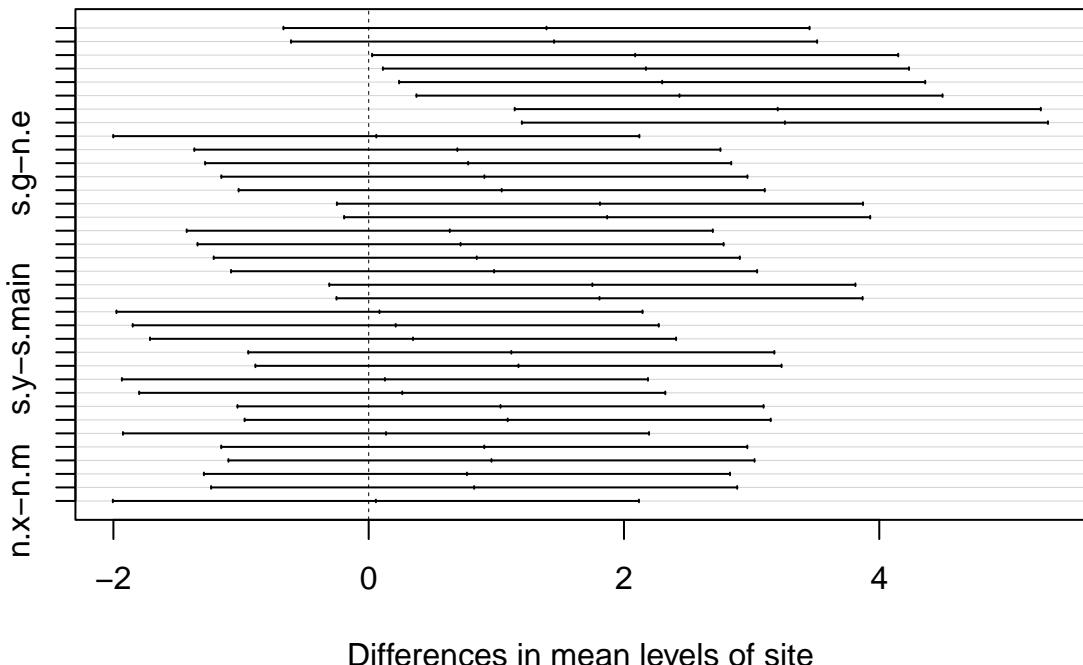
```

```

## s.y-s.a16      0.98228009 -1.07848262 3.043043 0.8657356
## n.m-s.a16     1.75212963 -0.30863308 3.812892 0.1711298
## n.x-s.a16     1.80840856 -0.25235415 3.869171 0.1399492
## s.g-s.main    0.08460648 -1.97615623 2.145369 1.0000000
## n.main-s.main 0.21168981 -1.84907290 2.272453 0.9999970
## s.y-s.main    0.34732060 -1.71344211 2.408083 0.9998620
## n.m-s.main    1.11717014 -0.94359257 3.177933 0.7579740
## n.x-s.main    1.17344907 -0.88731364 3.234212 0.7045171
## n.main-s.g    0.12708333 -1.93367938 2.187846 0.9999999
## s.y-s.g       0.26271412 -1.79804859 2.323477 0.9999838
## n.m-s.g       1.03256366 -1.02819905 3.093326 0.8293934
## n.x-s.g       1.08884259 -0.97192012 3.149605 0.7832059
## s.y-n.main    0.13563079 -1.92513192 2.196393 0.9999999
## n.m-n.main    0.90548032 -1.15528239 2.966243 0.9115999
## n.x-n.main    0.96175926 -1.09900345 3.022522 0.8791466
## n.m-s.y       0.76984954 -1.29091317 2.830612 0.9648195
## n.x-s.y       0.82612847 -1.23463424 2.886891 0.9467832
## n.x-n.m       0.05627894 -2.00448377 2.117042 1.0000000

```

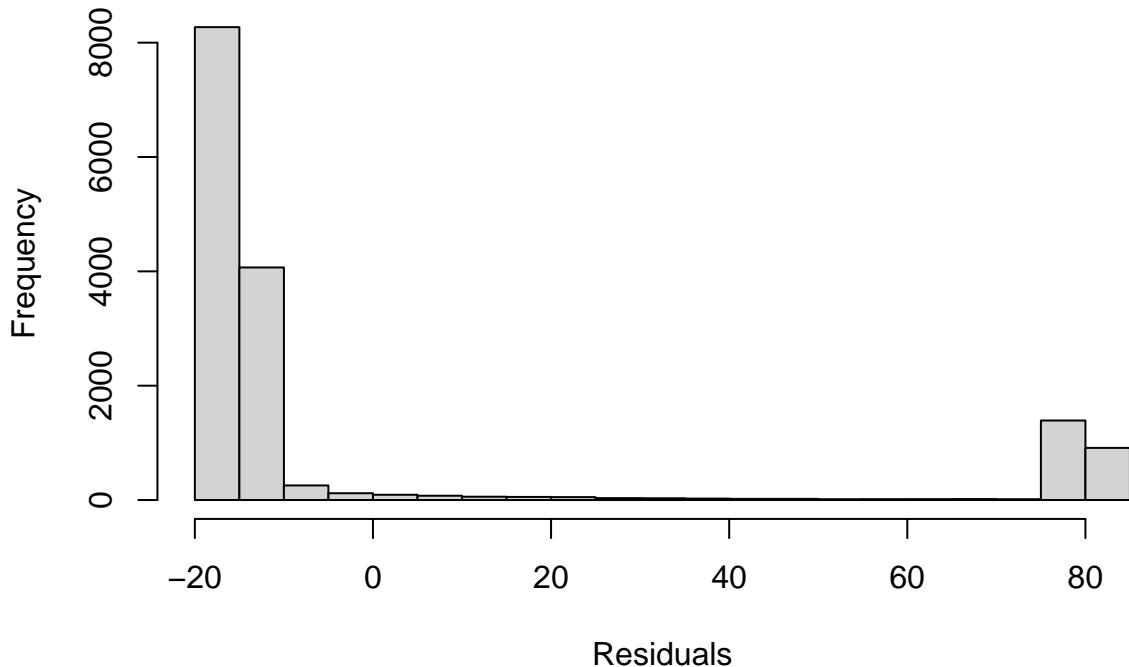
95% family-wise confidence level



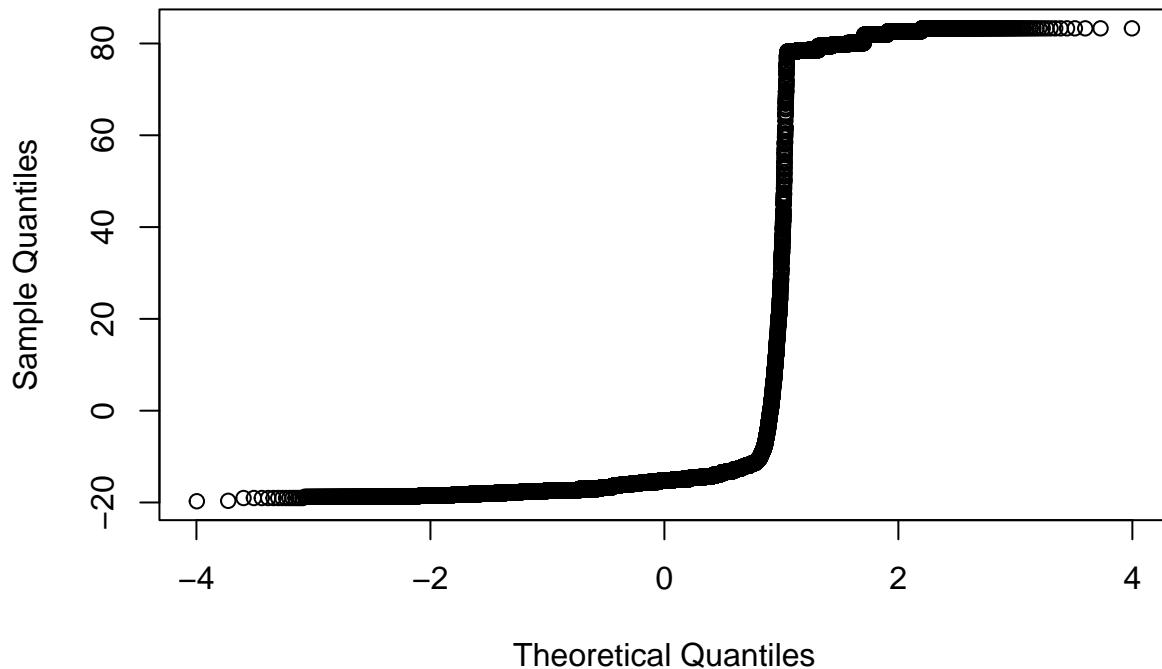
March 2021 Leaf Wetness by Site

```
## Analysis of Variance Table
##
## Response: wet
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site       8   49791  6223.9  5.2437 1.413e-06 ***
## Residuals 15543 18448522 1186.9
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 2021 Leaf Wetness anova



Normal Q-Q Plot



```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-03-01" & date <= "2021-03-31"))
##
## $site
##          diff      lwr      upr     p adj
## n.main-n.m 0.64074074 -2.99524490 4.276726 0.9998069
## n.x-n.m   1.38564815 -2.25033749 5.021634 0.9603817
## n.e-n.m   3.20225694 -0.43372869 6.838243 0.1366264
## s.a16-n.m  3.52280093 -0.11318471 7.158787 0.0662105
## s.main-n.m 3.84062500  0.20463936 7.476611 0.0291522
## s.g-n.m   4.73640046  1.10041483 8.372386 0.0017566
## s.y-n.m   4.82633102  1.19034538 8.462317 0.0012759
## s.a11-n.m  5.06788194  1.43189631 8.703868 0.0005234
## n.x-n.main 0.74490741 -2.89107823 4.380893 0.9994072
## n.e-n.main 2.56151620 -1.07446943 6.197502 0.4151940
## s.a16-n.main 2.88206019 -0.75392545 6.518046 0.2523750
## s.main-n.main 3.19988426 -0.43610138 6.835870 0.1373057
## s.g-n.main  4.09565972  0.45967408 7.731645 0.0140830
## s.y-n.main  4.18559028  0.54960464 7.821576 0.0107433
## s.a11-n.main 4.42714120  0.79115557 8.063127 0.0050127
## n.e-n.x    1.81660880 -1.81937684 5.452594 0.8316713
## s.a16-n.x   2.13715278 -1.49883286 5.773138 0.6665786
## s.main-n.x  2.45497685 -1.18100879 6.090962 0.4770238

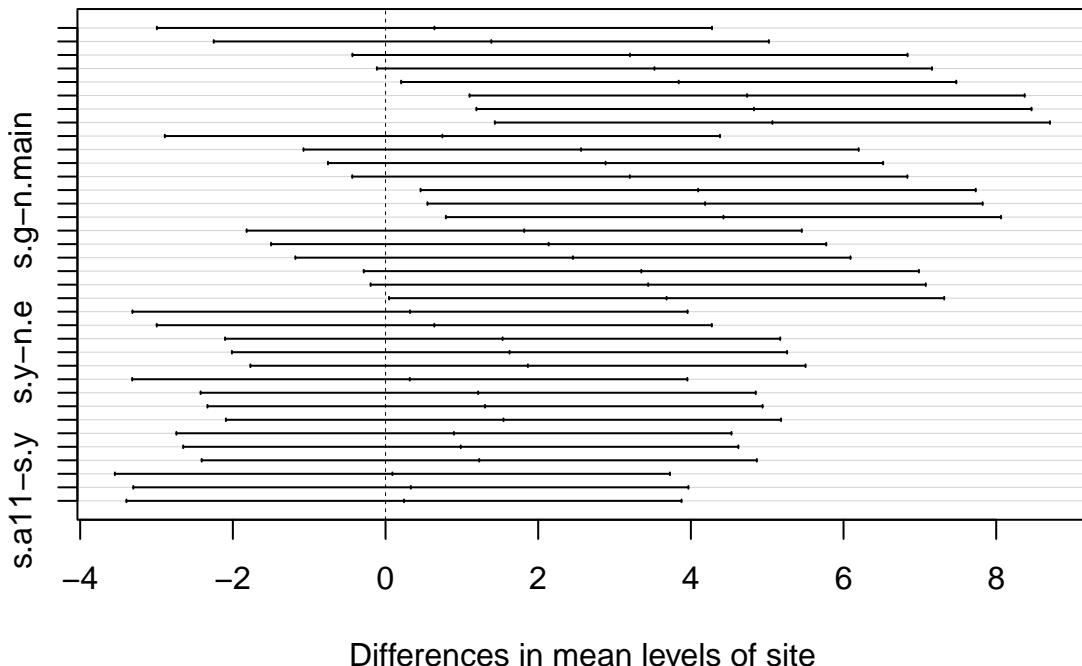
```

```

## s.g-n.x      3.35075231 -0.28523332 6.986738 0.0989817
## s.y-n.x      3.44068287 -0.19530277 7.076669 0.0805223
## s.a11-n.x    3.68223380  0.04624816 7.318219 0.0444177
## s.a16-n.e    0.32054398 -3.31544166 3.956530 0.9999991
## s.main-n.e   0.63836806 -2.99761758 4.274354 0.9998122
## s.g-n.e      1.53414352 -2.10184212 5.170129 0.9290445
## s.y-n.e      1.62407407 -2.01191156 5.260060 0.9035740
## s.a11-n.e    1.86562500 -1.77036064 5.501611 0.8097113
## s.main-s.a16 0.31782407 -3.31816156 3.953810 0.9999992
## s.g-s.a16   1.21359954 -2.42238610 4.849585 0.9824862
## s.y-s.a16   1.30353009 -2.33245555 4.939516 0.9726007
## s.a11-s.a16 1.54508102 -2.09090462 5.181067 0.9262188
## s.g-s.main   0.89577546 -2.74021017 4.531761 0.9977514
## s.y-s.main   0.98570602 -2.65027962 4.621692 0.9956095
## s.a11-s.main 1.22725694 -2.40872869 4.863243 0.9811951
## s.y-s.g     0.08993056 -3.54605508 3.725916 1.0000000
## s.a11-s.g    0.33148148 -3.30450416 3.967467 0.9999988
## s.a11-s.y    0.24155093 -3.39443471 3.877537 0.9999999

```

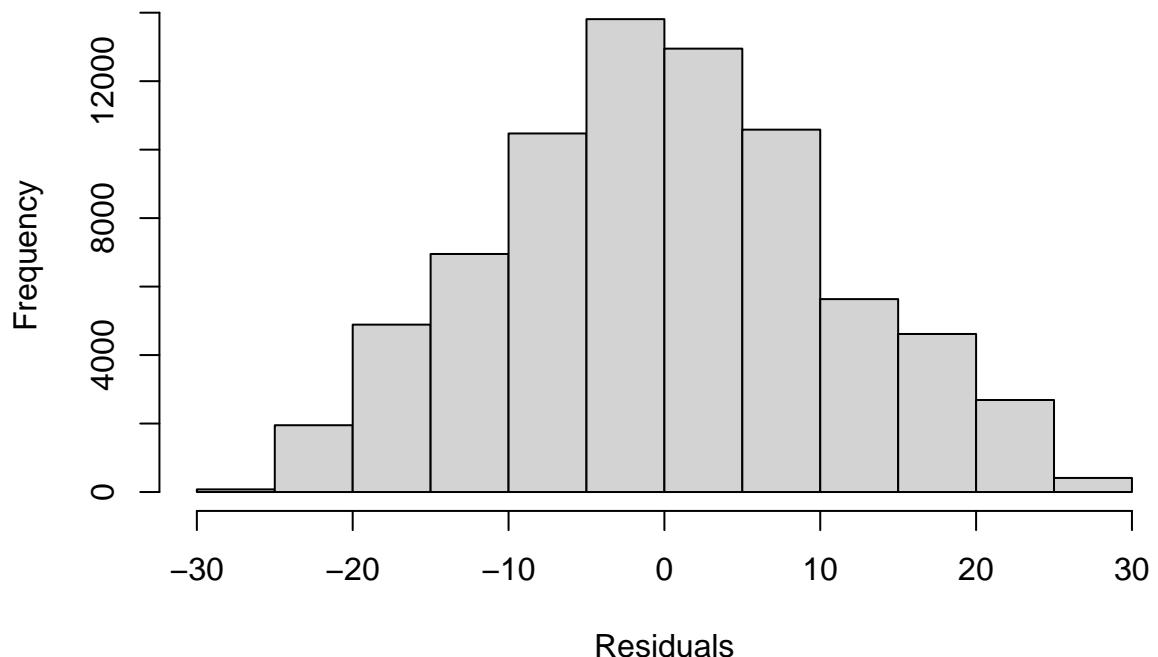
95% family-wise confidence level

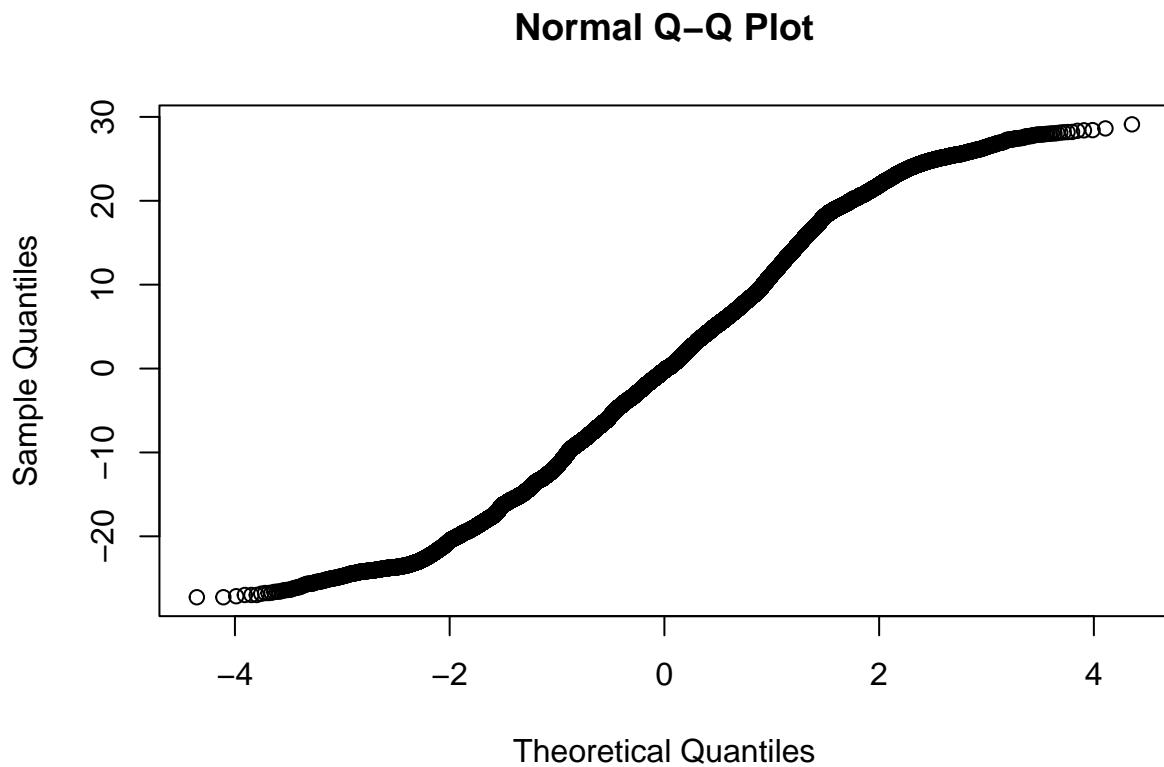


April 2021 Temperature by site

```
## Analysis of Variance Table
##
## Response: temp
##           Df  Sum Sq Mean Sq F value Pr(>F)
## site          8   2286  285.76   2.413 0.01333 *
## Residuals 75029 8885498 118.43
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 2021 temperature anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-04-01" & date <= "2021-04-30"))
##
## $site
##          diff      lwr      upr   p adj
## s.a11-n.m 0.014233233 -0.554565702 0.5830322 1.0000000
## n.e-n.m   0.156861610 -0.356843865 0.6705671 0.9901930
## n.main-n.m 0.174160090 -0.339500780 0.6878210 0.9806753
## s.a16-n.m  0.337323022 -0.176367582 0.8510136 0.5173549
## s.g-n.m   0.343400861 -0.170274874 0.8570766 0.4915890
## n.x-n.m   0.419052693 -0.094652783 0.9327582 0.2173155
## s.y-n.m   0.464257640 -0.049418095 0.9779334 0.1142281
## s.main-n.m 0.505328185 -0.008332686 1.0189891 0.0579748
## n.e-s.a11  0.142628377 -0.426170558 0.7114273 0.9974564
## n.main-s.a11 0.159926858 -0.408831793 0.7286855 0.9943670
## s.a16-s.a11 0.323089789 -0.245695714 0.8918753 0.7075009
## s.g-s.a11  0.329167629 -0.239604447 0.8979397 0.6856171
## n.x-s.a11  0.404819460 -0.163979475 0.9736184 0.4005578
## s.y-s.a11  0.450024408 -0.118747668 1.0187965 0.2547551
## s.main-s.a11 0.491094952 -0.077663699 1.0598536 0.1555138
## n.main-n.e  0.017298481 -0.496362390 0.5309594 1.0000000
## s.a16-n.e   0.180461413 -0.333229191 0.6941520 0.9758602
## s.g-n.e    0.186539252 -0.327136484 0.7002150 0.9703936

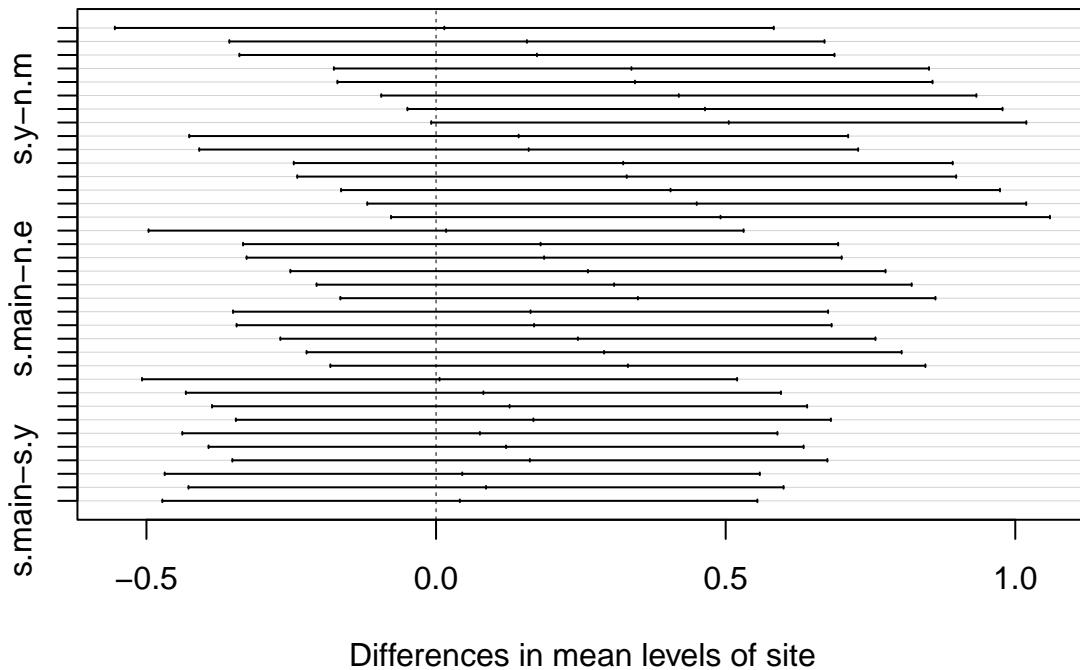
```

```

## n.x-n.e      0.262191083 -0.251514392 0.7758966 0.8143732
## s.y-n.e      0.307396031 -0.206279705 0.8210718 0.6441886
## s.main-n.e    0.348466575 -0.165194295 0.8621274 0.4702983
## s.a16-n.main  0.163162932 -0.350483066 0.6768089 0.9872870
## s.g-n.main    0.169240771 -0.344390357 0.6828719 0.9838929
## n.x-n.main    0.244892602 -0.268768268 0.7585535 0.8657096
## s.y-n.main    0.290097550 -0.223533578 0.8037287 0.7140186
## s.main-n.main  0.331168094 -0.182448167 0.8447844 0.5433585
## s.g-s.a16     0.006077839 -0.507583024 0.5197387 1.0000000
## n.x-s.a16     0.081729670 -0.431960934 0.5954203 0.9999110
## s.y-s.a16     0.126934618 -0.386726245 0.6405955 0.9977058
## s.main-s.a16  0.168005163 -0.345640835 0.6816512 0.9846363
## n.x-s.g       0.075651831 -0.438023904 0.5893276 0.9999507
## s.y-s.g       0.120856779 -0.392789215 0.6345028 0.9983820
## s.main-s.g    0.161927323 -0.351703805 0.6755585 0.9879001
## s.y-n.x       0.045204948 -0.468470788 0.5588807 0.9999991
## s.main-n.x    0.086275492 -0.427385378 0.5999364 0.9998658
## s.main-s.y    0.041070544 -0.472560584 0.5547017 0.9999996

```

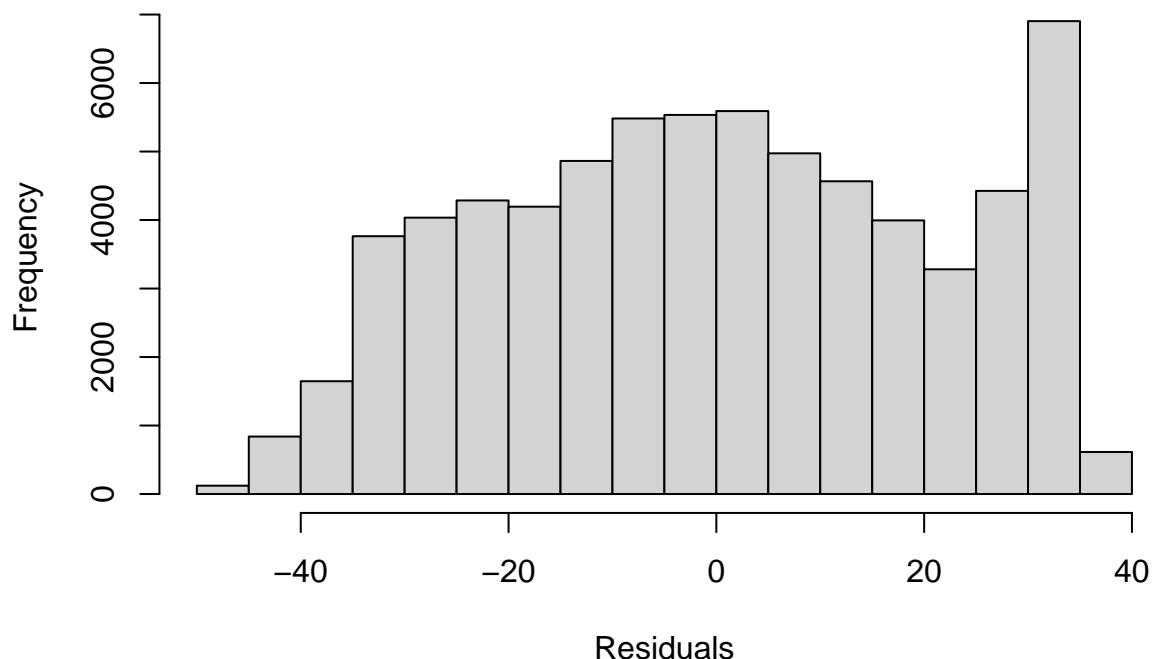
95% family-wise confidence level

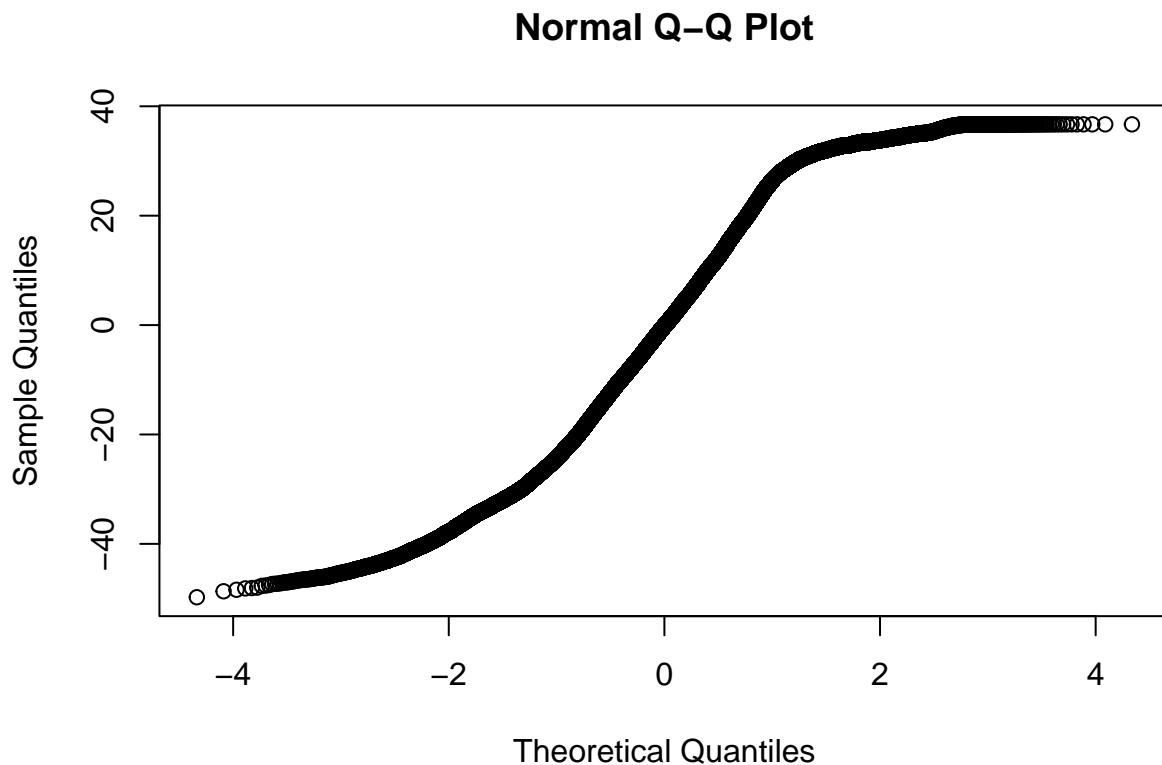


April 2021 Relative Humidity by Site

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site       7   87710  12530  27.971 < 2.2e-16 ***
## Residuals 69112 30959449     448
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 2021 Relative humidity anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-05-01" & date <= "2021-05-30"))
##
## $site
##          diff      lwr      upr   p adj
## n.e-n.main 1.30003356 0.324040931 2.276026 0.0013985
## s.g-n.main  1.51492593 0.538933293 2.490919 0.0000693
## n.m-n.main  1.61128819 0.635295561 2.587281 0.0000155
## s.main-n.main 1.69914352 0.723150885 2.675136 0.0000036
## s.a16-n.main 2.25548958 1.279496950 3.231482 0.0000000
## n.x-n.main  3.23295023 2.256957598 4.208943 0.0000000
## s.y-n.main  3.90480324 2.928810607 4.880796 0.0000000
## s.g-n.e    0.21489236 -0.761100272 1.190885 0.9977973
## n.m-n.e    0.31125463 -0.664738004 1.287247 0.9790406
## s.main-n.e  0.39910995 -0.576882680 1.375103 0.9202074
## s.a16-n.e  0.95545602 -0.020536615 1.931449 0.0601127
## n.x-n.e    1.93291667  0.956924033 2.908909 0.0000001
## s.y-n.e    2.60476968  1.628777043 3.580762 0.0000000
## n.m-s.g    0.09636227 -0.879630365 1.072355 0.9999896
## s.main-s.g  0.18421759 -0.791775041 1.160210 0.9991850
## s.a16-s.g  0.74056366 -0.235428976 1.716556 0.2935296
## n.x-s.g    1.71802431  0.742031672 2.694017 0.0000026
## s.y-s.g    2.38987731  1.413884681 3.365870 0.0000000

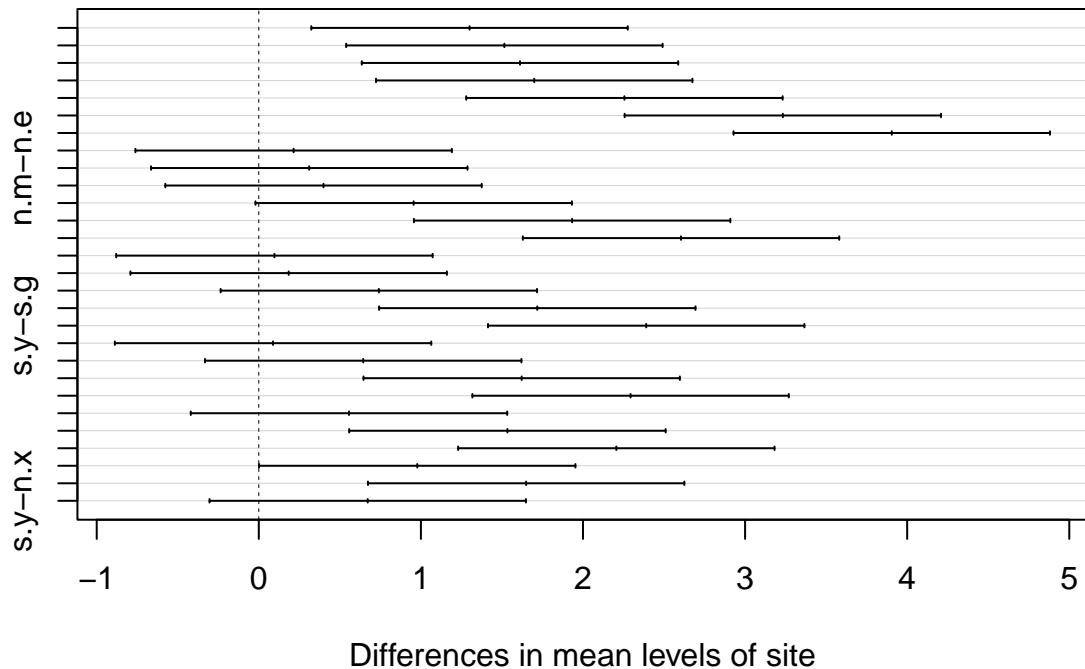
```

```

## s.main-n.m    0.08785532 -0.888137309 1.063848 0.99999945
## s.a16-n.m    0.64420139 -0.331791244 1.620194 0.4814086
## n.x-n.m     1.62166204  0.645669404 2.597655 0.0000131
## s.y-n.m     2.29351505  1.317522413 3.269508 0.0000000
## s.a16-s.main 0.55634606 -0.419646569 1.532339 0.6690517
## n.x-s.main   1.53380671  0.557814080 2.509799 0.0000521
## s.y-s.main   2.20565972  1.229667089 3.181652 0.0000000
## n.x-s.a16   0.97746065  0.001468015 1.953453 0.0493357
## s.y-s.a16   1.64931366  0.673321024 2.625306 0.0000084
## s.y-n.x     0.67185301 -0.304139624 1.647846 0.4237076

```

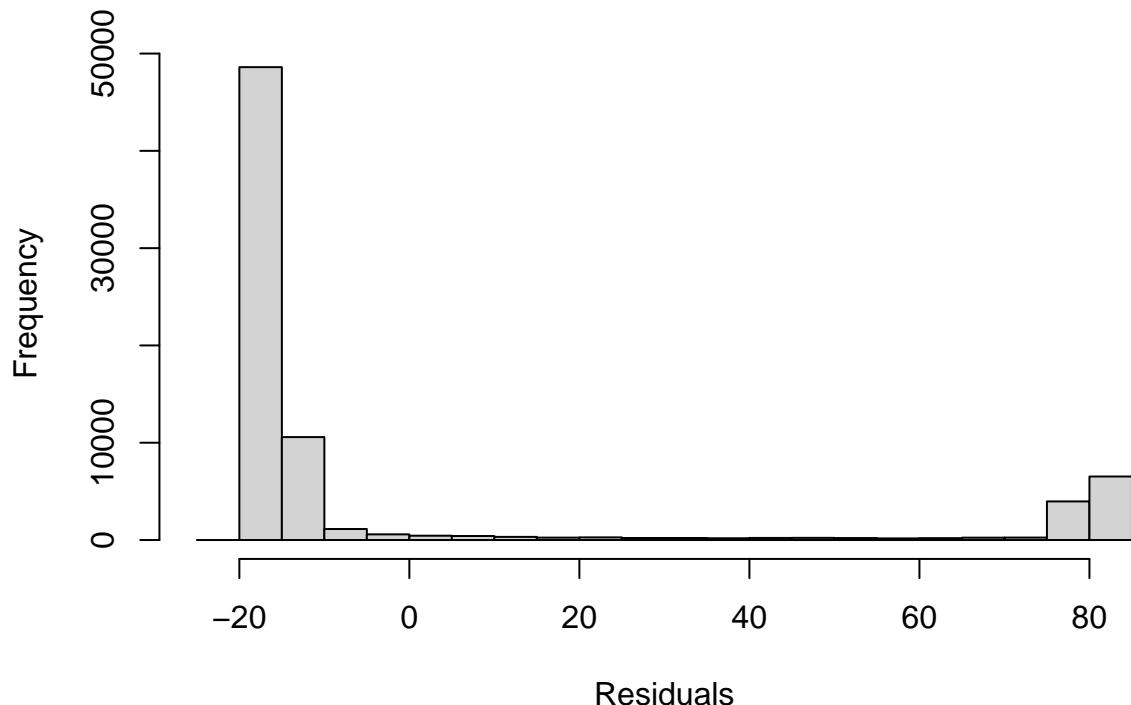
95% family-wise confidence level

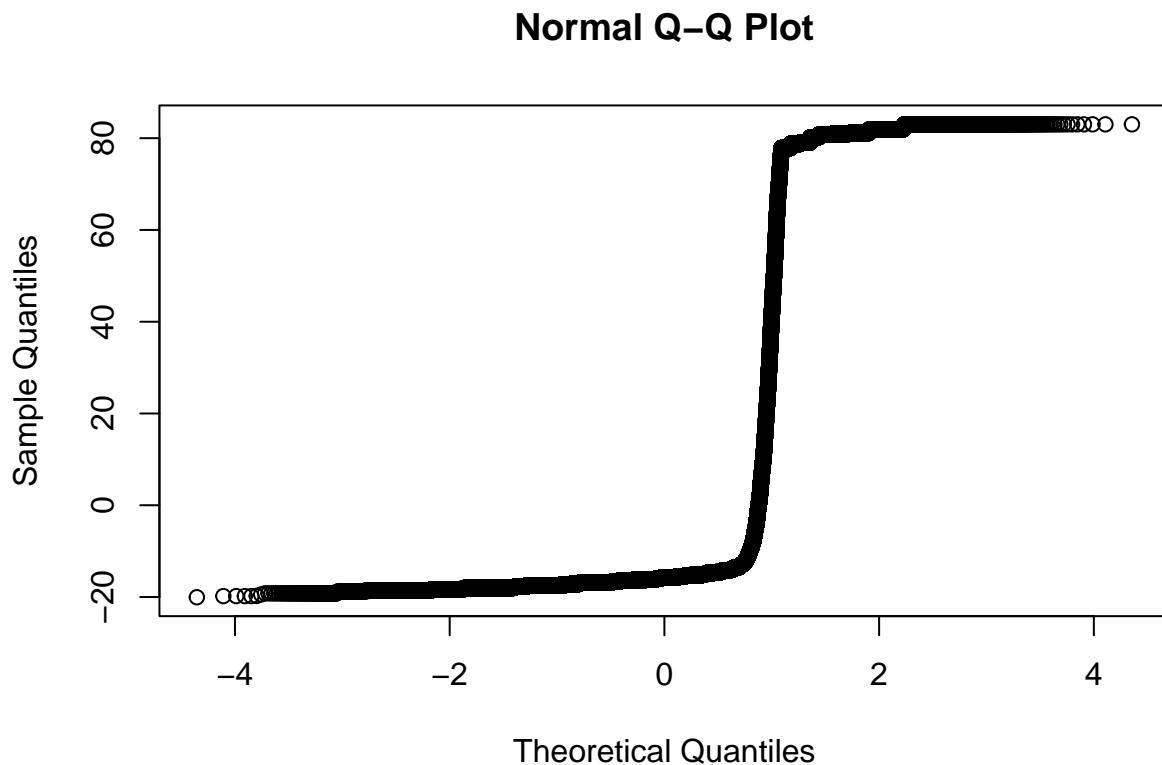


April 2021 Leaf Wetness by Site

```
## Analysis of Variance Table
##
## Response: wet
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site       8 182604 22825.6 19.196 < 2.2e-16 ***
## Residuals 75178 89390895 1189.1
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

April 2021 Leaf Wetness anova





```

## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-04-01" & date <= "2021-04-30"))
##
## $site
##          diff      lwr      upr   p adj
## n.main-n.m 1.1033969 -0.52421719 2.731011 0.4713173
## s.g-n.m    1.8768543  0.24914607 3.504563 0.0105099
## s.main-n.m 2.0703221  0.44270802 3.697936 0.0025822
## s.a16-n.m  2.2664036  0.63874246 3.894065 0.0005317
## n.x-n.m    2.8148662  1.02537137 4.604361 0.0000375
## s.a11-n.m  3.9741447  2.34643648 5.601853 0.0000000
## s.y-n.m    4.2614135  2.63375230 5.889075 0.0000000
## n.e-n.m    5.1589821  3.53132090 6.786643 0.0000000
## s.g-n.main 0.7734575 -0.85410945 2.401024 0.8678332
## s.main-n.main 0.9669252 -0.66054749 2.594398 0.6533393
## s.a16-n.main 1.1630068 -0.46451305 2.790527 0.3947182
## n.x-n.main  1.7114693 -0.07789692 3.500836 0.0737959
## s.a11-n.main 2.8707479  1.24318096 4.498315 0.0000016
## s.y-n.main  3.1580166  1.53049679 4.785536 0.0000001
## n.e-n.main  4.0555852  2.42806539 5.683105 0.0000000
## s.main-s.g  0.1934677 -1.43409919 1.821035 0.9999906
## s.a16-s.g   0.3895493 -1.23806474 2.017163 0.9981723
## n.x-s.g    0.9380118 -0.85144010 2.727464 0.7907733

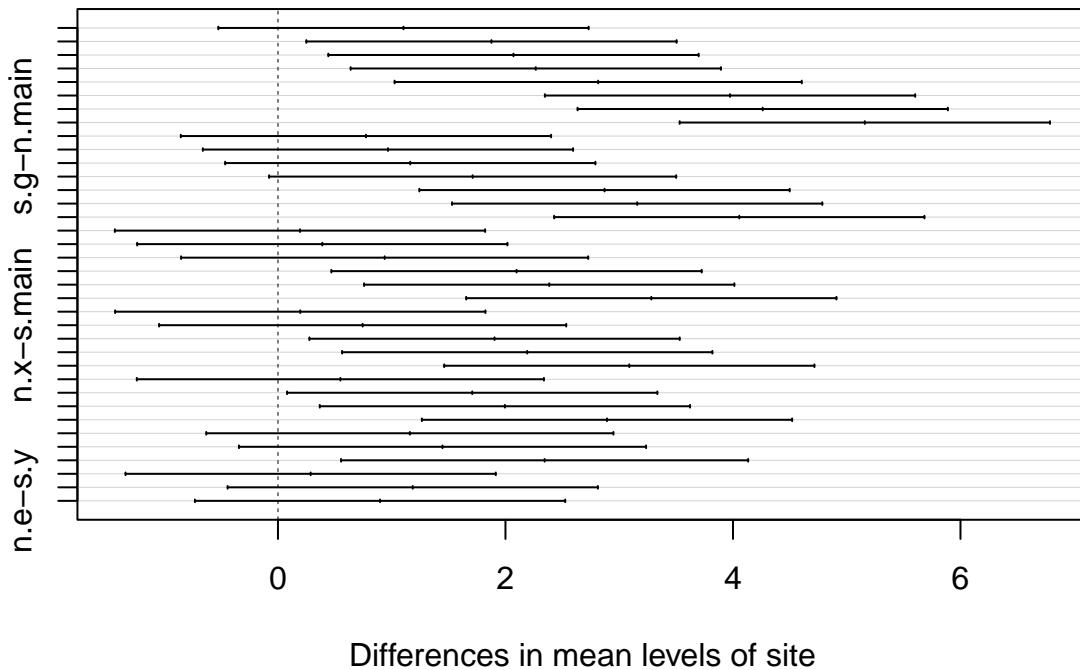
```

```

## s.a11-s.g      2.0972904  0.46962927 3.724952 0.0020980
## s.y-s.g       2.3845591  0.75694510 4.012173 0.0001904
## n.e-s.g       3.2821277  1.65451370 4.909742 0.0000000
## s.a16-s.main   0.1960815 -1.43143826 1.823601 0.9999895
## n.x-s.main    0.7445441 -1.04482214 2.533910 0.9343877
## s.a11-s.main   1.9038227  0.27625575 3.531390 0.0087175
## s.y-s.main    2.1910914  0.56357158 3.818611 0.0009923
## n.e-s.main    3.0886600  1.46114018 4.716180 0.0000001
## n.x-s.a16     0.5484626 -1.24094653 2.337872 0.9899457
## s.a11-s.a16   1.7077411  0.08012710 3.335355 0.0312534
## s.y-s.a16     1.9950098  0.36744293 3.622577 0.0045421
## n.e-s.a16     2.8925784  1.26501153 4.520145 0.0000013
## s.a11-n.x     1.1592786 -0.63017338 2.948731 0.5366503
## s.y-n.x       1.4465473 -0.34286181 3.235956 0.2281353
## n.e-n.x       2.3441159  0.55470679 4.133525 0.0015950
## s.y-s.a11     0.2872687 -1.34034532 1.914883 0.9998049
## n.e-s.a11     1.1848373 -0.44277672 2.812451 0.3680722
## n.e-s.y       0.8975686 -0.72999831 2.525136 0.7402708

```

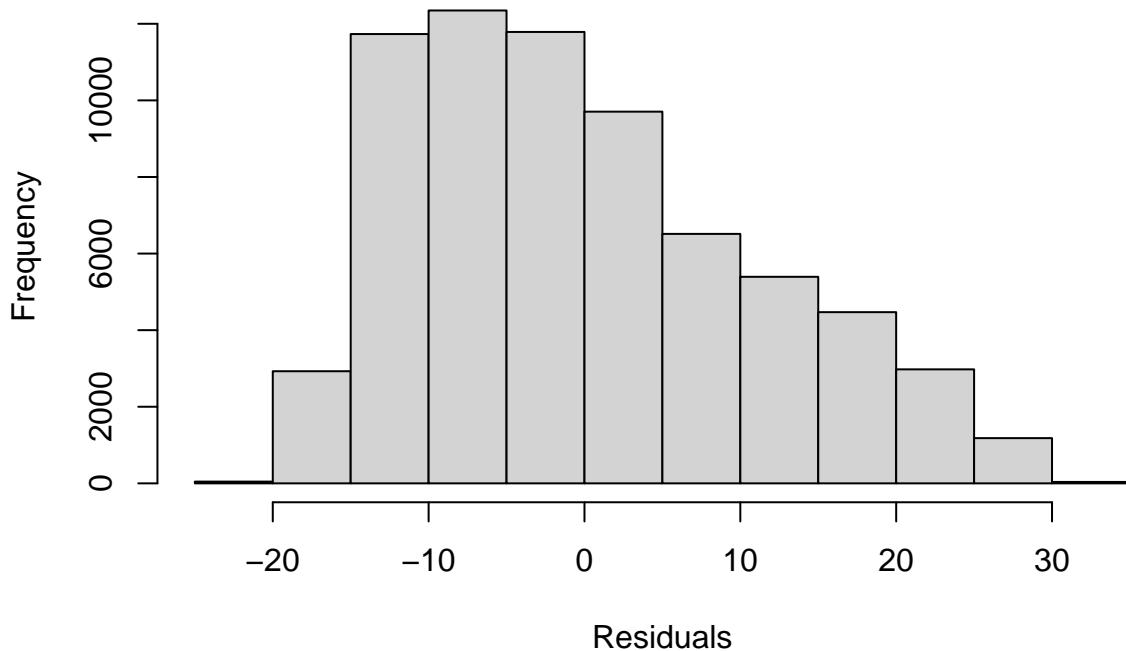
95% family-wise confidence level



May 2021 Temperature by site

```
## Analysis of Variance Table
##
## Response: temp
##             Df  Sum Sq Mean Sq F value Pr(>F)
## site          7   1156   165.13  1.3485 0.2226
## Residuals 69112 8463064  122.45
```

May 2021 temperature anova



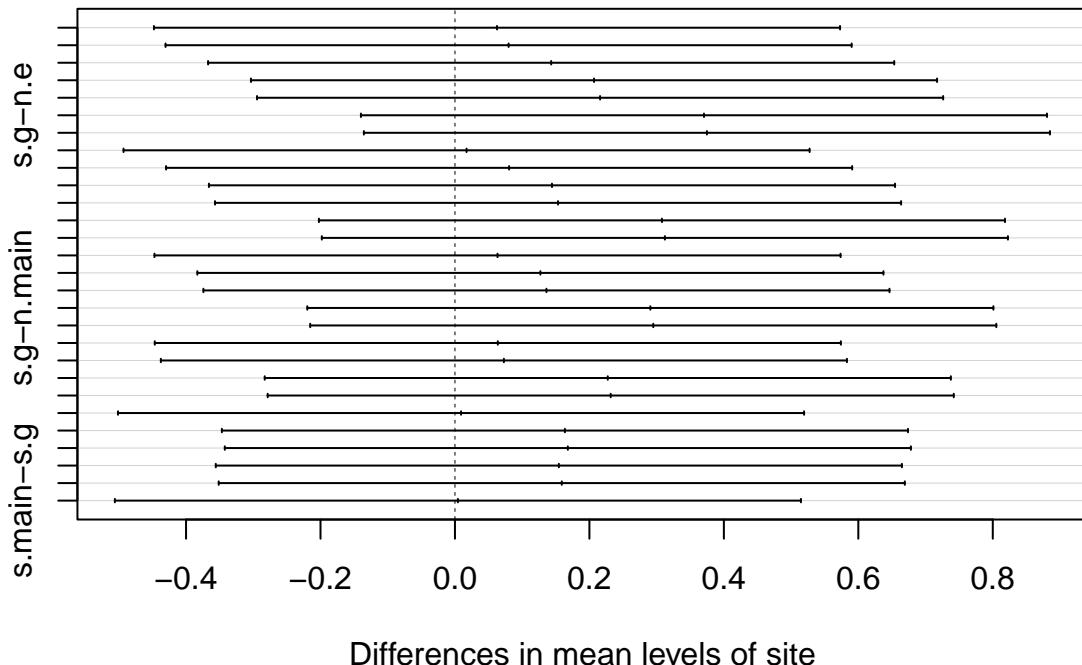
```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = temp ~ site, data = subset(sensors, date >= "2021-05-01" & date <= "2021-05-30"))
##
## $site
##            diff      lwr      upr    p adj
## n.m-n.e  0.062530093 -0.4477560 0.5728162 0.99999546
## n.main-n.e 0.079785880 -0.4305002 0.5900720 0.9997652
## s.a16-n.e 0.143105324 -0.3671808 0.6533914 0.9901366
## n.x-n.e  0.206855324 -0.3034308 0.7171414 0.9236163
## s.y-n.e  0.215890046 -0.2943961 0.7261762 0.9056669
## s.g-n.e  0.370418981 -0.1398671 0.8807051 0.3514900
## s.main-n.e 0.374781250 -0.1355049 0.8850674 0.3358946
## n.main-n.m 0.017255787 -0.4930303 0.5275419 1.0000000
```

```

## s.a16-n.m      0.080575231 -0.4297109 0.5908613 0.9997493
## n.x-n.m       0.144325231 -0.3659609 0.6546113 0.9896223
## s.y-n.m       0.153359954 -0.3569262 0.6636461 0.9851344
## s.g-n.m       0.307888889 -0.2023972 0.8181750 0.6003137
## s.main-n.m    0.312251157 -0.1980349 0.8225373 0.5823740
## s.a16-n.main   0.063319444 -0.4469667 0.5736056 0.9999506
## n.x-n.main    0.127069444 -0.3832167 0.6373556 0.9952238
## s.y-n.main    0.136104167 -0.3741819 0.6463903 0.9927156
## s.g-n.main    0.290633102 -0.2196530 0.8009192 0.6700239
## s.main-n.main  0.294995370 -0.2152907 0.8052815 0.6526630
## n.x-s.a16     0.063750000 -0.4465361 0.5740361 0.9999482
## s.y-s.a16     0.072784722 -0.4375014 0.5830708 0.9998732
## s.g-s.a16     0.227313657 -0.2829724 0.7375998 0.8794377
## s.main-s.a16   0.231675926 -0.2786102 0.7419620 0.8683796
## s.y-n.x       0.009034722 -0.5012514 0.5193208 1.0000000
## s.g-n.x       0.163563657 -0.3467224 0.6738498 0.9784239
## s.main-n.x    0.167925926 -0.3423602 0.6782120 0.9749471
## s.g-s.y       0.154528935 -0.3557572 0.6648150 0.9844595
## s.main-s.y    0.158891204 -0.3513949 0.6691773 0.9817322
## s.main-s.g    0.004362269 -0.5059238 0.5146484 1.0000000

```

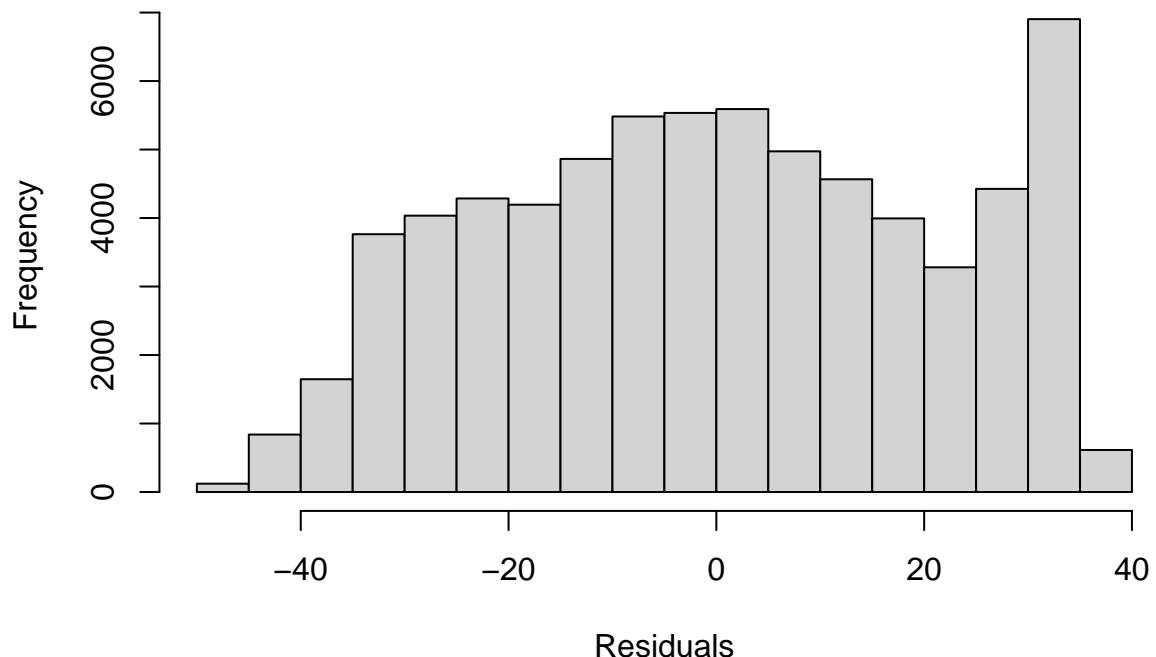
95% family-wise confidence level



May 2021 Relative Humidity by Site

```
## Analysis of Variance Table
##
## Response: rh
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site       7   87710  12530  27.971 < 2.2e-16 ***
## Residuals 69112 30959449     448
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

May 2021 Relative humidity anova



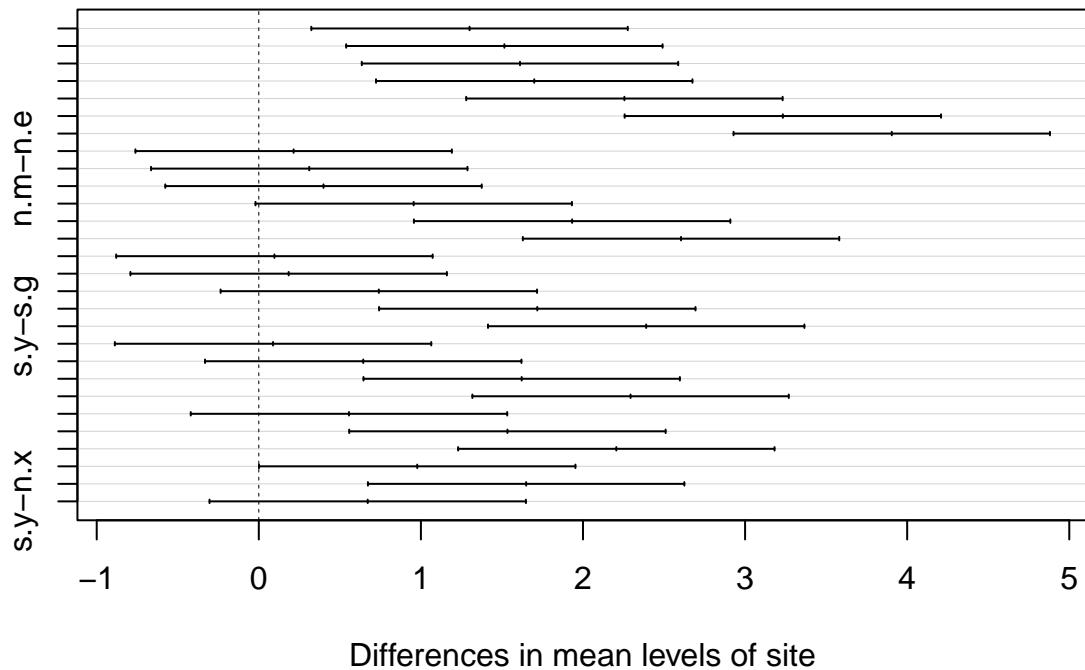
```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = rh ~ site, data = subset(sensors, date >= "2021-05-01" & date <= "2021-05-30"))
##
## $site
##           diff      lwr      upr   p adj
## n.e-n.main 1.30003356 0.324040931 2.276026 0.0013985
## s.g-n.main  1.51492593 0.538933293 2.490919 0.0000693
## n.m-n.main  1.61128819 0.635295561 2.587281 0.0000155
## s.main-n.main 1.69914352 0.723150885 2.675136 0.0000036
## s.a16-n.main 2.25548958 1.279496950 3.231482 0.0000000
## n.x-n.main  3.23295023 2.256957598 4.208943 0.0000000
```

```

## s.y-n.main    3.90480324  2.928810607 4.880796 0.0000000
## s.g-n.e      0.21489236 -0.761100272 1.190885 0.9977973
## n.m-n.e      0.31125463 -0.664738004 1.287247 0.9790406
## s.main-n.e   0.39910995 -0.576882680 1.375103 0.9202074
## s.a16-n.e   0.95545602 -0.020536615 1.931449 0.0601127
## n.x-n.e     1.93291667  0.956924033 2.908909 0.0000001
## s.y-n.e      2.60476968  1.628777043 3.580762 0.0000000
## n.m-s.g     0.09636227 -0.879630365 1.072355 0.9999896
## s.main-s.g   0.18421759 -0.791775041 1.160210 0.9991850
## s.a16-s.g   0.74056366 -0.235428976 1.716556 0.2935296
## n.x-s.g     1.71802431  0.742031672 2.694017 0.0000026
## s.y-s.g     2.38987731  1.413884681 3.365870 0.0000000
## s.main-n.m   0.08785532 -0.888137309 1.063848 0.9999945
## s.a16-n.m   0.64420139 -0.331791244 1.620194 0.4814086
## n.x-n.m     1.62166204  0.645669404 2.597655 0.0000131
## s.y-n.m     2.29351505  1.317522413 3.269508 0.0000000
## s.a16-s.main 0.55634606 -0.419646569 1.532339 0.6690517
## n.x-s.main   1.53380671  0.557814080 2.509799 0.0000521
## s.y-s.main   2.20565972  1.229667089 3.181652 0.0000000
## n.x-s.a16   0.97746065  0.001468015 1.953453 0.0493357
## s.y-s.a16   1.64931366  0.673321024 2.625306 0.0000084
## s.y-n.x     0.67185301 -0.304139624 1.647846 0.4237076

```

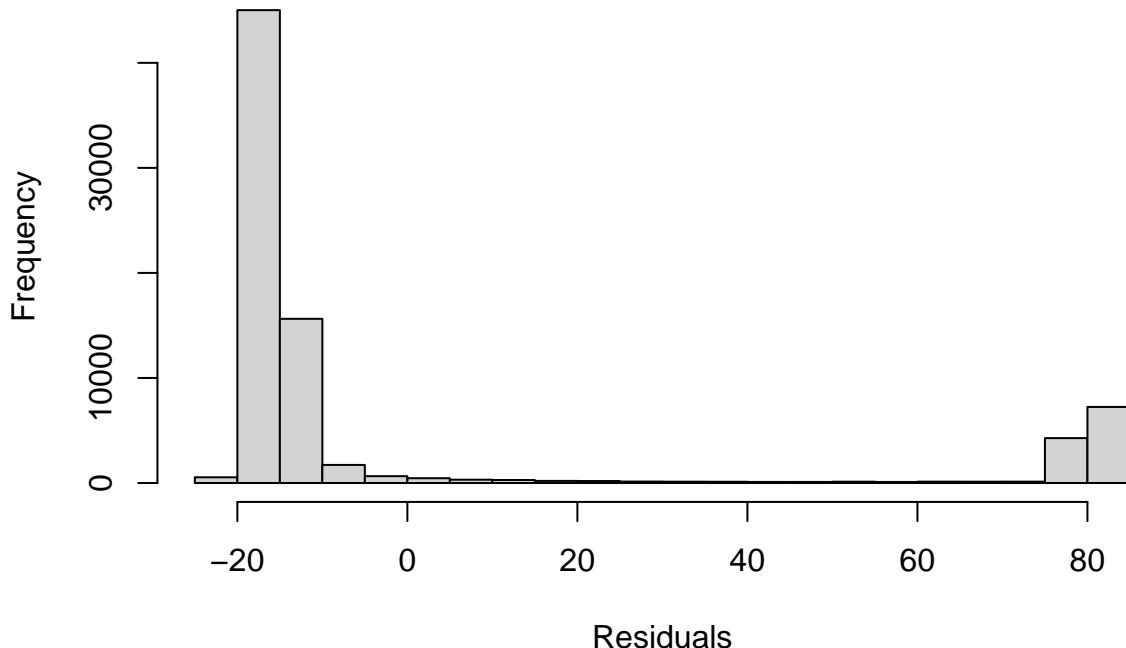
95% family-wise confidence level



May 2021 Leaf Wetness by Site

```
## Analysis of Variance Table
##
## Response: wet
##           Df  Sum Sq Mean Sq F value    Pr(>F)
## site       8  371067  46383  38.349 < 2.2e-16 ***
## Residuals 77751 94041250   1210
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

May 2021 Relative humidity anova



```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
## factor levels have been ordered
##
## Fit: aov(formula = wet ~ site, data = subset(sensors, date >= "2021-05-01" & date <= "2021-05-30"))
##
## $site
##           diff      lwr      upr     p adj
## n.main-n.m 1.14087963 -0.5003464 2.782106 0.4347930
## n.x-n.m    2.42005787  0.7788319 4.061284 0.0001659
## s.g-n.m    4.19824074  2.5570147 5.839467 0.0000000
## n.e-n.m    4.23398148  2.5927555 5.875207 0.0000000
## s.main-n.m 4.24923611  2.6080101 5.890462 0.0000000
## s.a16-n.m  4.82537037  3.1841444 6.466596 0.0000000
```

```

## s.a11-n.m      6.14413194  4.5029060  7.785358  0.0000000
## s.y-n.m       7.32848380  5.6872578  8.969710  0.0000000
## n.x-n.main    1.27917824 -0.3620478  2.920404  0.2741490
## s.g-n.main    3.05736111  1.4161351  4.698587  0.0000003
## n.e-n.main    3.09310185  1.4518759  4.734328  0.0000002
## s.main-n.main 3.10835648  1.4671305  4.749582  0.0000002
## s.a16-n.main   3.68449074  2.0432647  5.325717  0.0000000
## s.a11-n.main   5.00325231  3.3620263  6.644478  0.0000000
## s.y-n.main     6.18760417  4.5463782  7.828830  0.0000000
## s.g-n.x        1.77818287  0.1369569  3.419409  0.0221427
## n.e-n.x        1.81392361  0.1726976  3.455150  0.0176490
## s.main-n.x     1.82917824  0.1879522  3.470404  0.0159924
## s.a16-n.x      2.40531250  0.7640865  4.046538  0.0001890
## s.a11-n.x      3.72407407  2.0828481  5.365300  0.0000000
## s.y-n.x        4.90842593  3.2671999  6.549652  0.0000000
## n.e-s.g        0.03574074 -1.6054853  1.676967  1.0000000
## s.main-s.g     0.05099537 -1.5902306  1.692221  1.0000000
## s.a16-s.g      0.62712963 -1.0140964  2.268356  0.9597976
## s.a11-s.g      1.94589120  0.3046652  3.587117  0.0072718
## s.y-s.g        3.13024306  1.4890171  4.771469  0.0000001
## s.main-n.e     0.01525463 -1.6259714  1.656481  1.0000000
## s.a16-n.e      0.59138889 -1.0498371  2.232615  0.9717680
## s.a11-n.e      1.91015046  0.2689245  3.551376  0.0093153
## s.y-n.e        3.09450231  1.4532763  4.735728  0.0000002
## s.a16-s.main   0.57613426 -1.0650917  2.217360  0.9759731
## s.a11-s.main   1.89489583  0.2536698  3.536122  0.0103364
## s.y-s.main     3.07924769  1.4380217  4.720474  0.0000002
## s.a11-s.a16    1.31876157 -0.3224644  2.959988  0.2354963
## s.y-s.a16      2.50311343  0.8618874  4.144339  0.0000782
## s.y-s.a11      1.18435185 -0.4568741  2.825578  0.3805928

```

95% family-wise confidence level

