Examining environmental drivers on greenhouse denitrification potential in a constructed stormwater wetland (aka 2017 CSW)

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Project Description: Analysis of seasonal denitrification potential in a constructed stormwater wetland (Greenville, NC, USA).

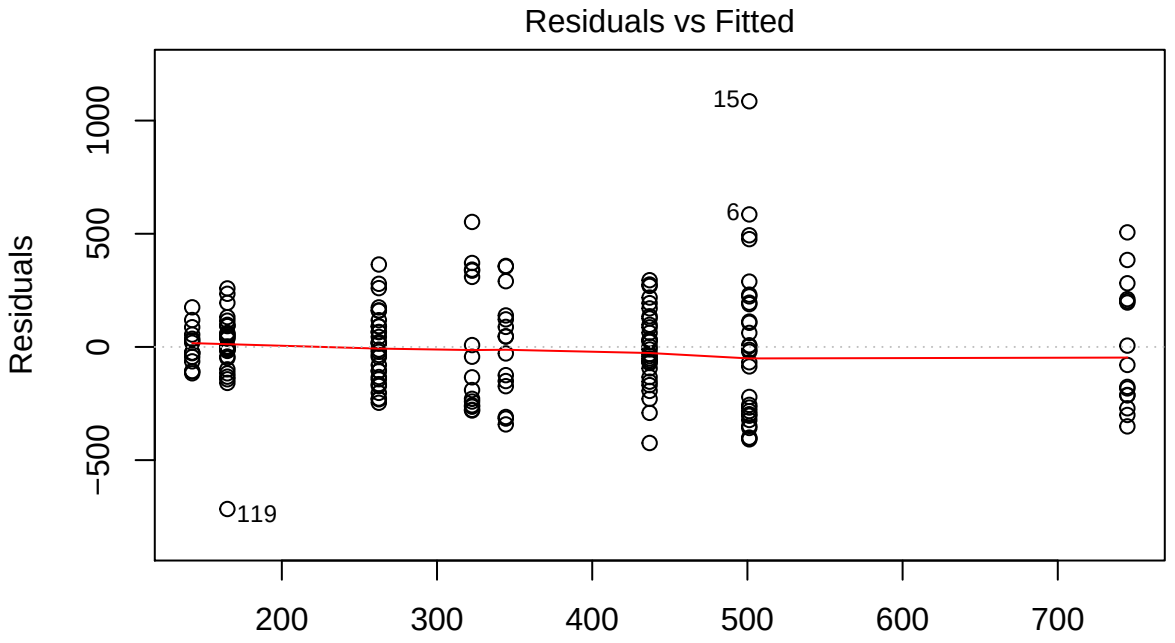
```
if(Sys.info()[1] == "Darwin"){
  setwd("~/GitHub/ConstructedStormwaterWetland/analyses/")
} else {
  # setwd(choose.dir())
}
rm(list = ls())

library(ggplot2)
library(psych)
```

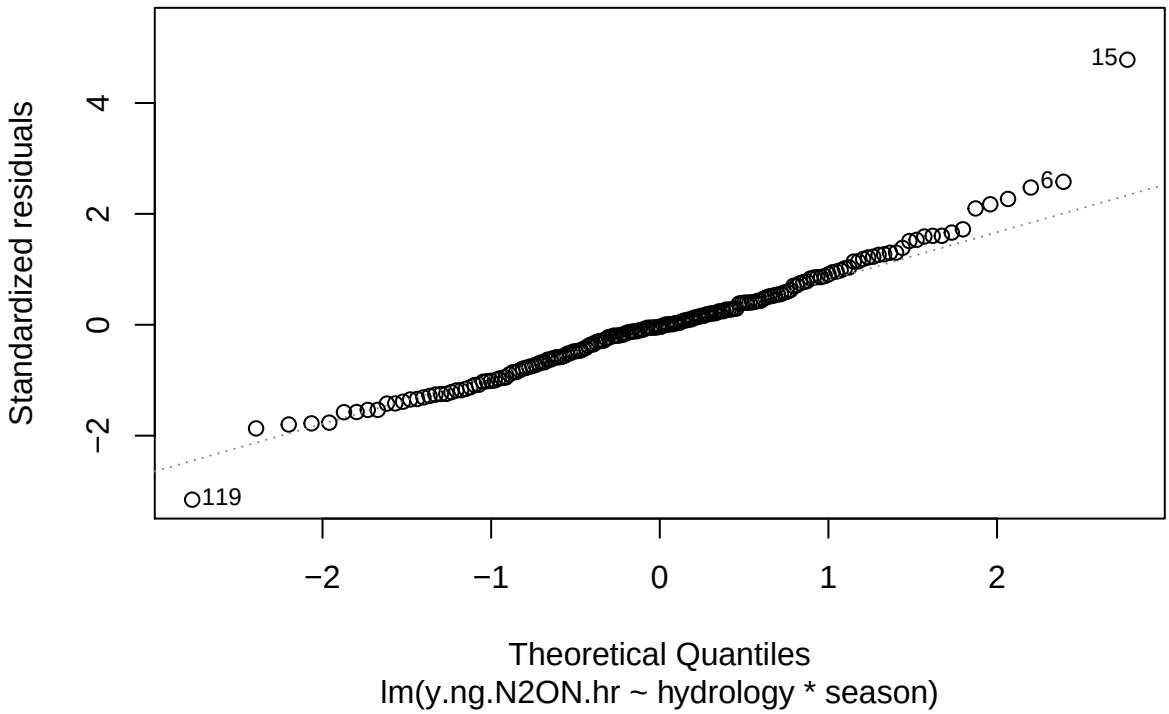
```
##
## Attaching package: 'psych'
```

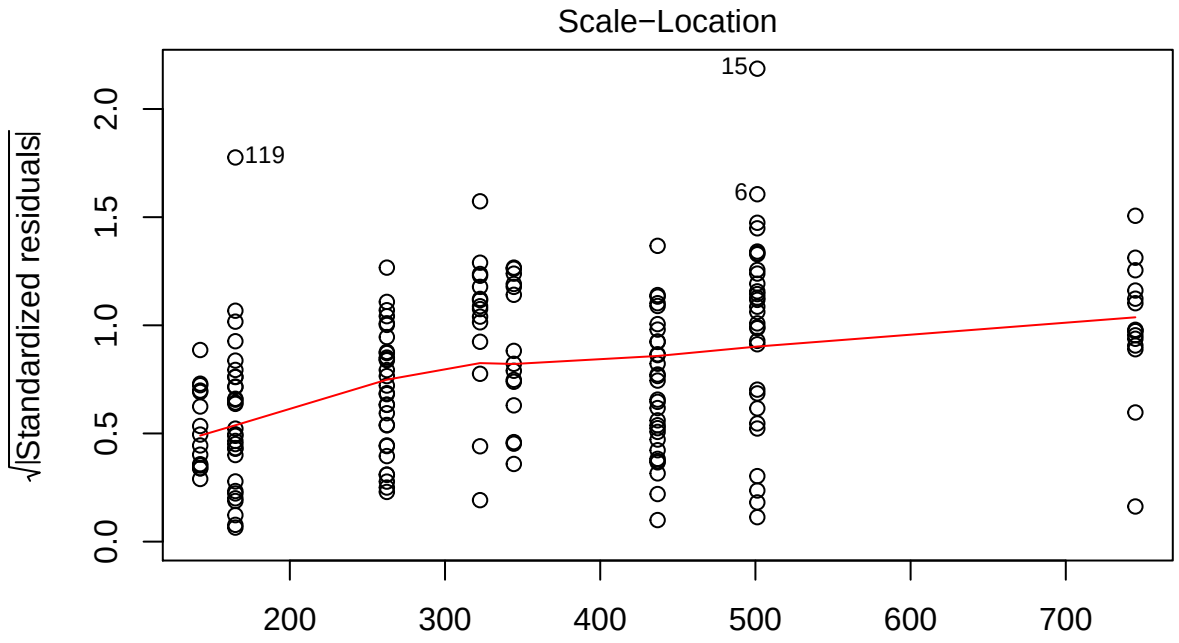
```
## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha
```

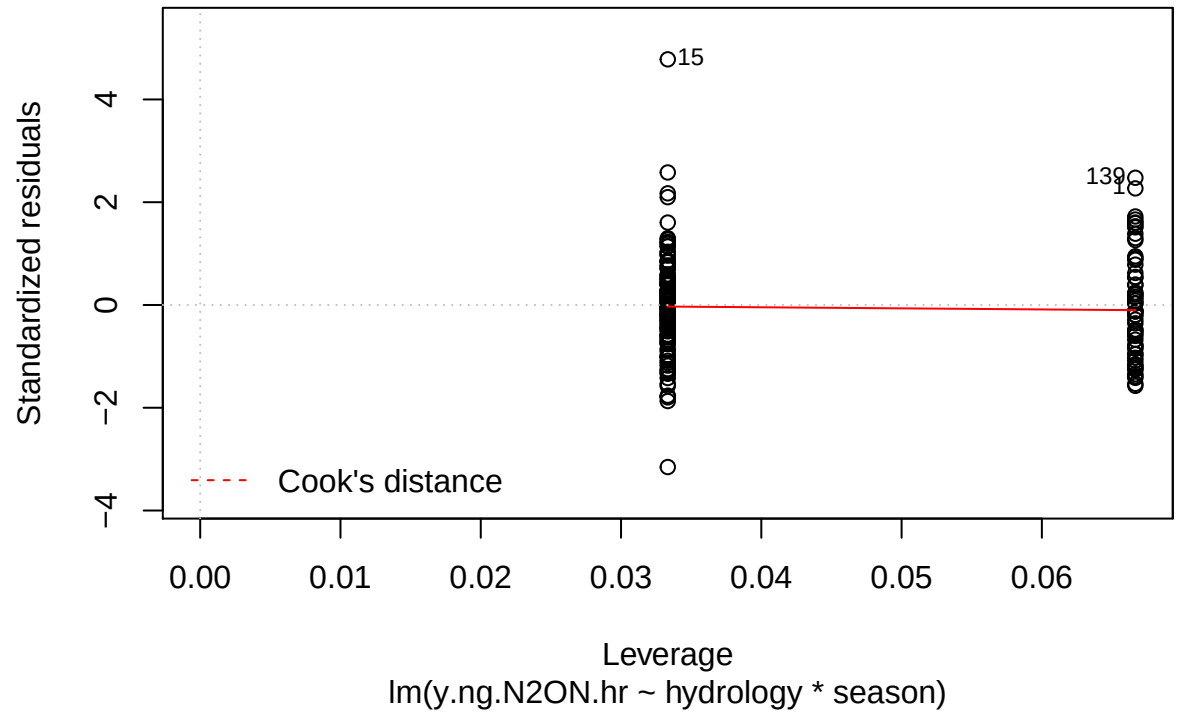
```
#CSW DEA data
DEA <- read.csv("../data/CSW_DEA_Env.csv", header=T)
```

```
#linear model for no acetylene/ yes acetylene DEA ratio
DEA.lm <- lm(y.ng.N2ON.hr~hydrology*season,data=DEA)
plot(DEA.lm)
```


Residuals vs Fitted
Residuals
1000
500
0
−500
15
6
119
200
300
400
500
600
700
Fitted values
lm(y.ng.N2ON.hr ~ hydrology * season)


Normal Q−Q
Standardized residuals
4
2
0
−2
15
6
119
−2
−1
0
1
2
Theoretical Quantiles
lm(y.ng.N2ON.hr ~ hydrology * season)



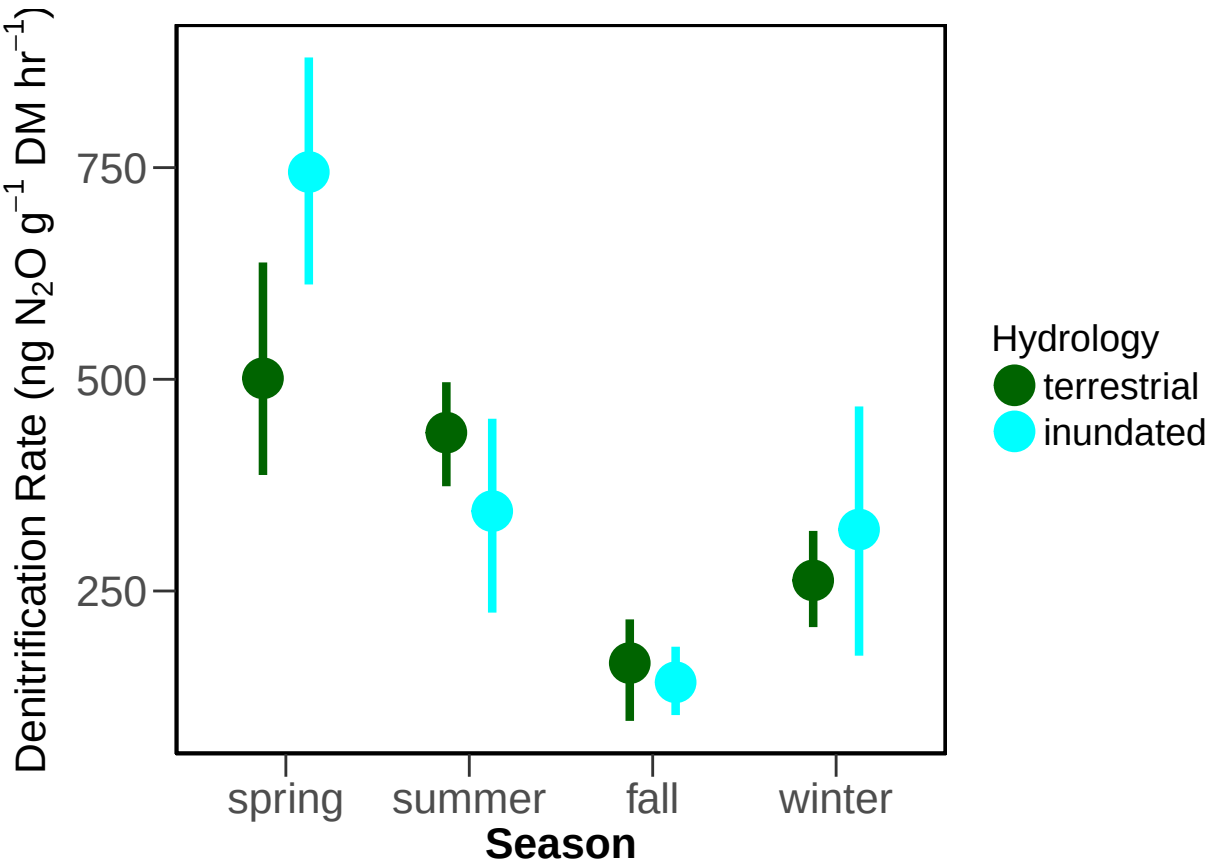



```
anova(DEA.lm)
```

```
## Analysis of Variance Table
##
## Response: y.ng.N2ON.hr
##                   Df  Sum Sq Mean Sq F value    Pr(>F)
```

```
## hydrology          1   88708   88708  1.6643  0.198757
## season             3 4438591 1479530 27.7581 1.087e-14 ***
## hydrology:season   3  631854  210618  3.9515  0.009321 **
## Residuals        172 9167737   53301
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

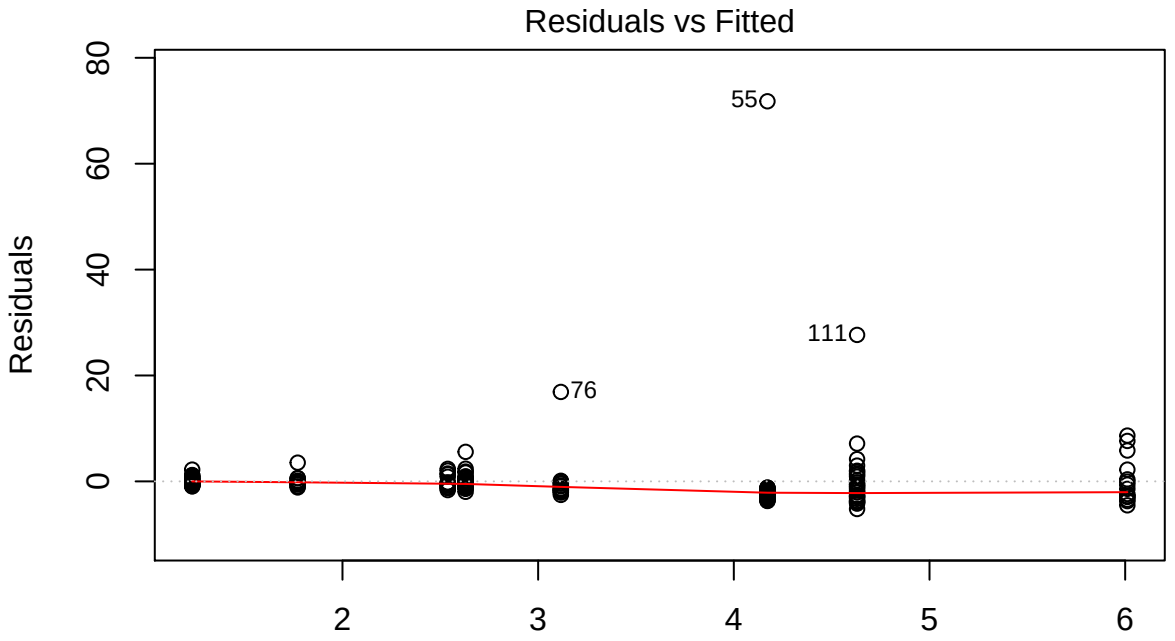
```
p <- ggplot(DEA, aes(x=season, y=y.ng.N2ON.hr, color=as.factor(hydrology))) + stat_summary(fun.data=mea
p + theme_bw() + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(), axis.lin
```

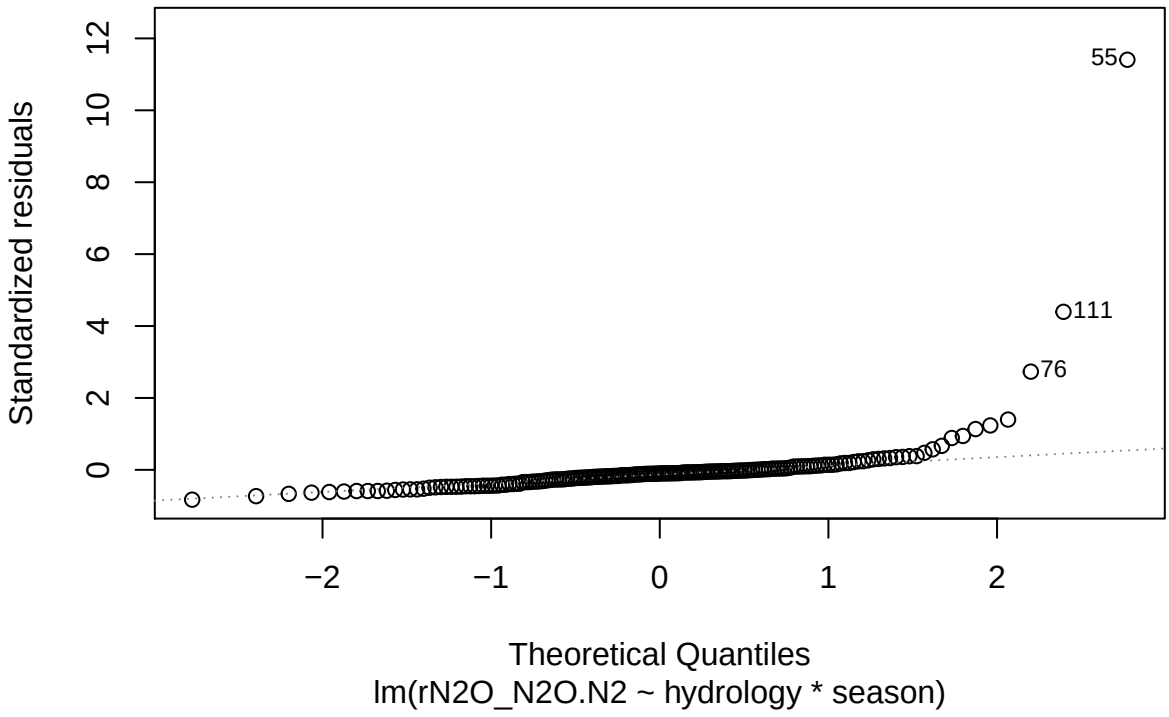


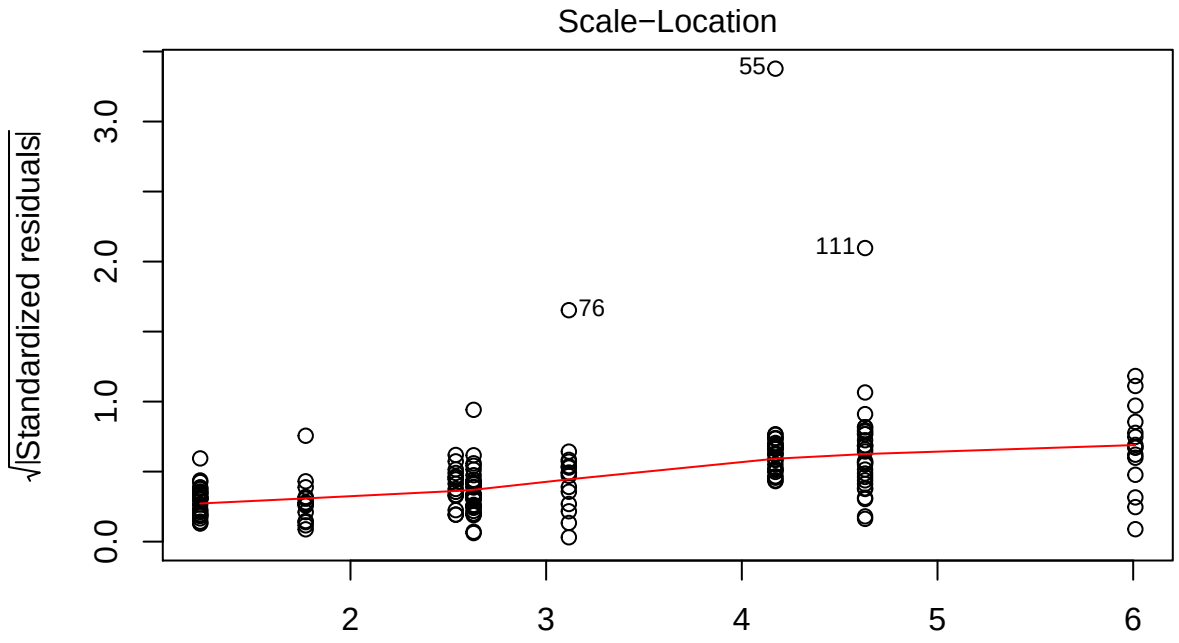

```
ggsave("../figures/DEApotential.pdf", plot=last_plot(), device=NULL, path=NULL, scale=1, width=NA, heig
```

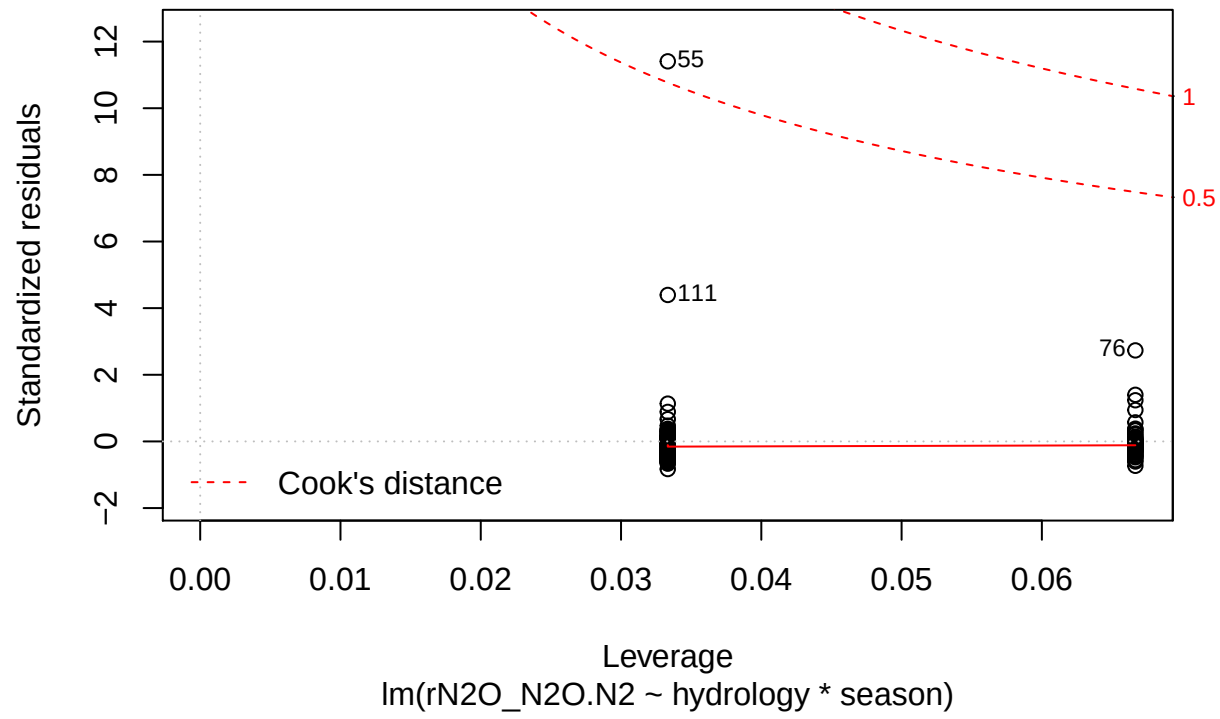
```
## Saving 6.5 x 4.5 in image
```

```
#linear model for no acetylene/ yes acetylene DEA ratio
ratio.lm <- lm(rN2O_N2O.N2~hydrology*season,data=DEA)
plot(ratio.lm)
```


Residuals vs Fitted
Residuals
Fitted values
lm(rN2O_N2O.N2 ~ hydrology * season)
55
111
76


Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(rN2O_N2O.N2 ~ hydrology * season)
55
111
76



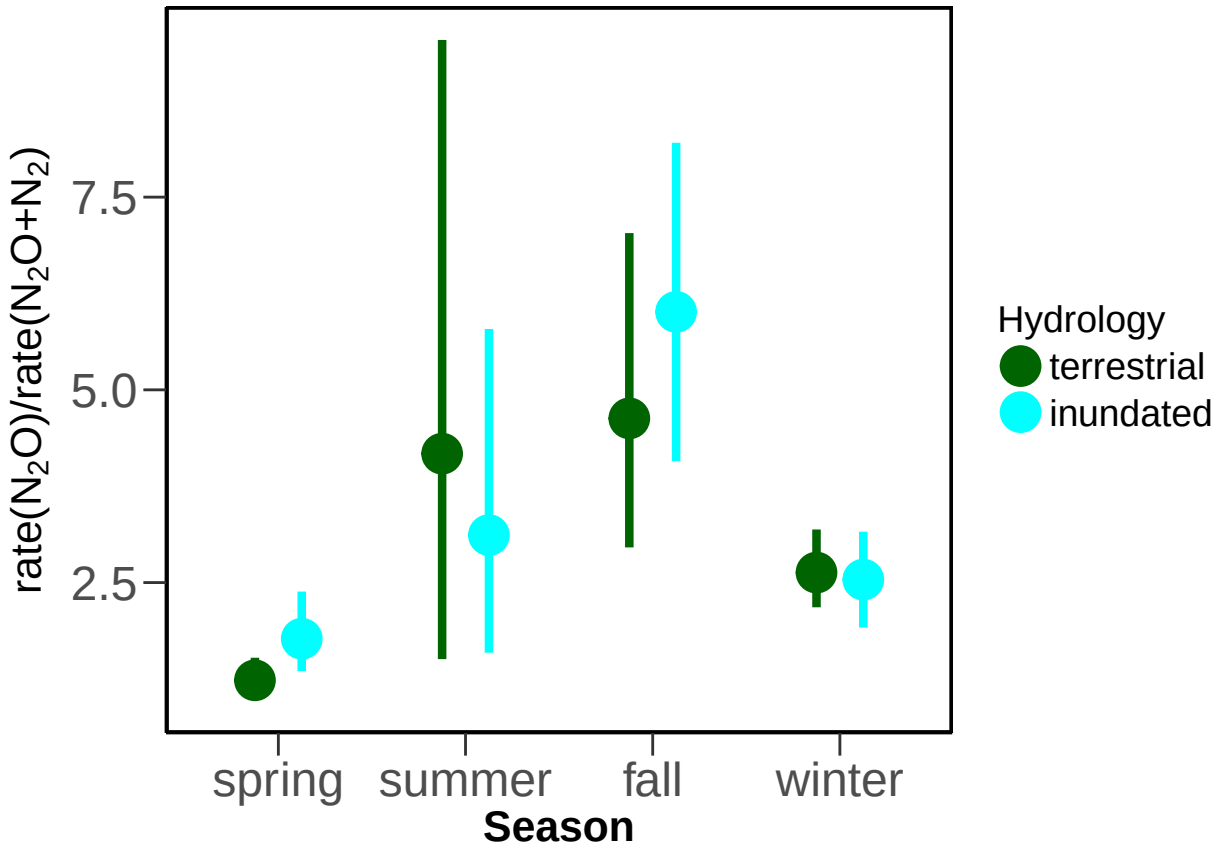



```
anova(ratio.lm)
```

```
## Analysis of Variance Table
##
## Response: rN2O_N2O.N2
##                   Df Sum Sq Mean Sq F value Pr(>F)
```

```
## hydrology          1    1.5   1.496  0.0365 0.8487
## season             3  338.1 112.702  2.7510 0.0443 *
## hydrology:season   3   31.7  10.573  0.2581 0.8555
## Residuals        172 7046.3  40.967
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

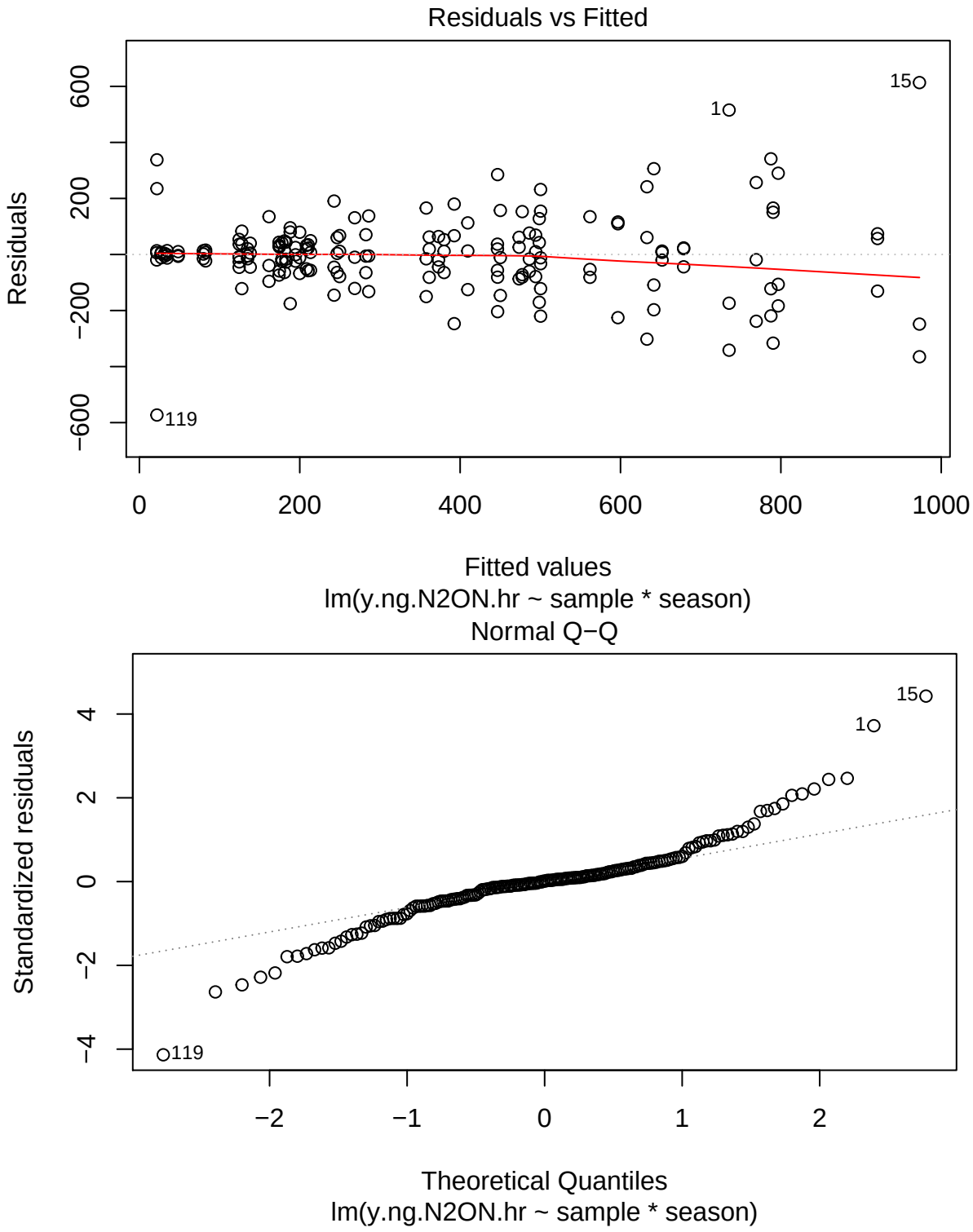
```
p <- ggplot(DEA, aes(x=season, y=rN2O_N2O.N2, color=as.factor(hydrology))) + stat_summary(fun.data=mean_
p + theme_bw() + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(), axis.lin
```

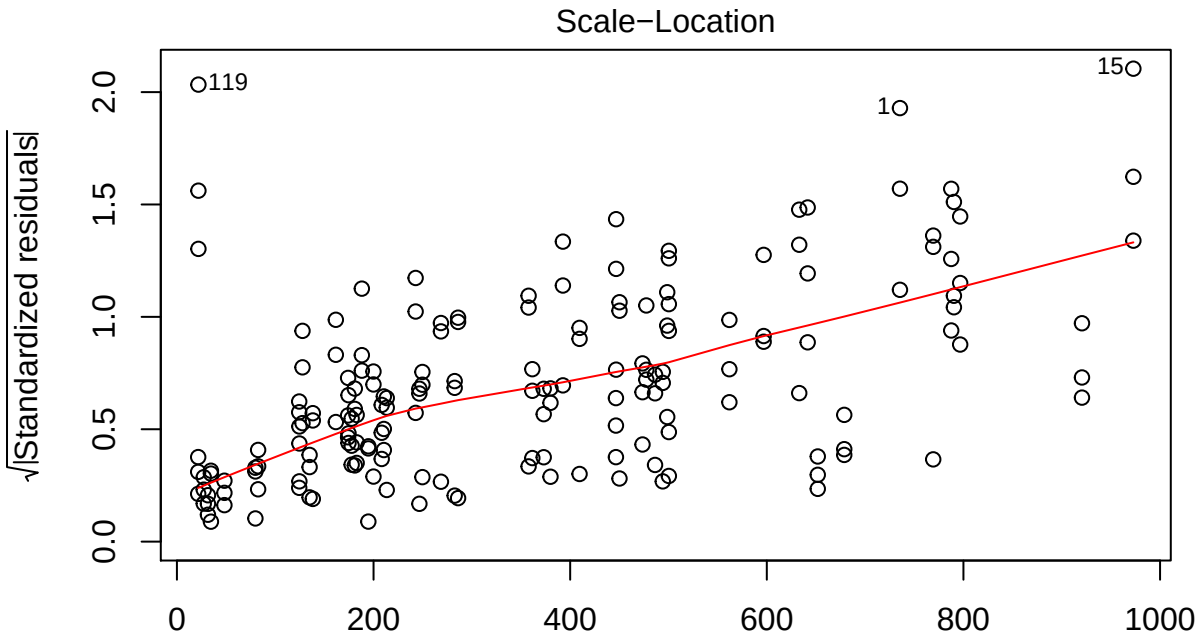


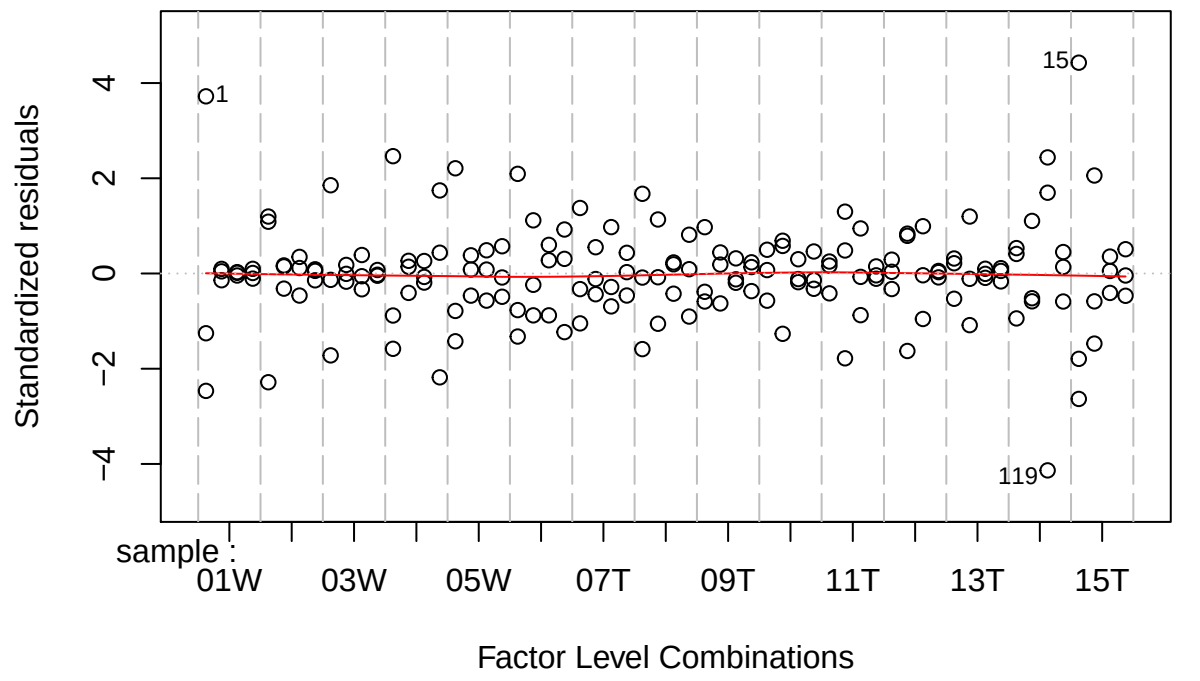

```
ggsave("../figures/DEAratio.pdf", plot=last_plot(), device=NULL, path=NULL, scale=1, width=NA, height=NA
```

```
## Saving 6.5 x 4.5 in image
```

```
#linear model for no acetylene/ yes acetylene DEA ratio
DEA.lm <- lm(y.ng.N2ON.hr~sample*season,data=DEA)
plot(DEA.lm)
```


Residuals vs Fitted
Residuals
600
200
−200
−600
15
1
119
0
200
400
600
800
1000
Fitted values
lm(y.ng.N2ON.hr ~ sample * season)
Normal Q−Q
Standardized residuals
4
2
0
−2
−4
15
1
119
−2
−1
0
1
2
Theoretical Quantiles
lm(y.ng.N2ON.hr ~ sample * season)



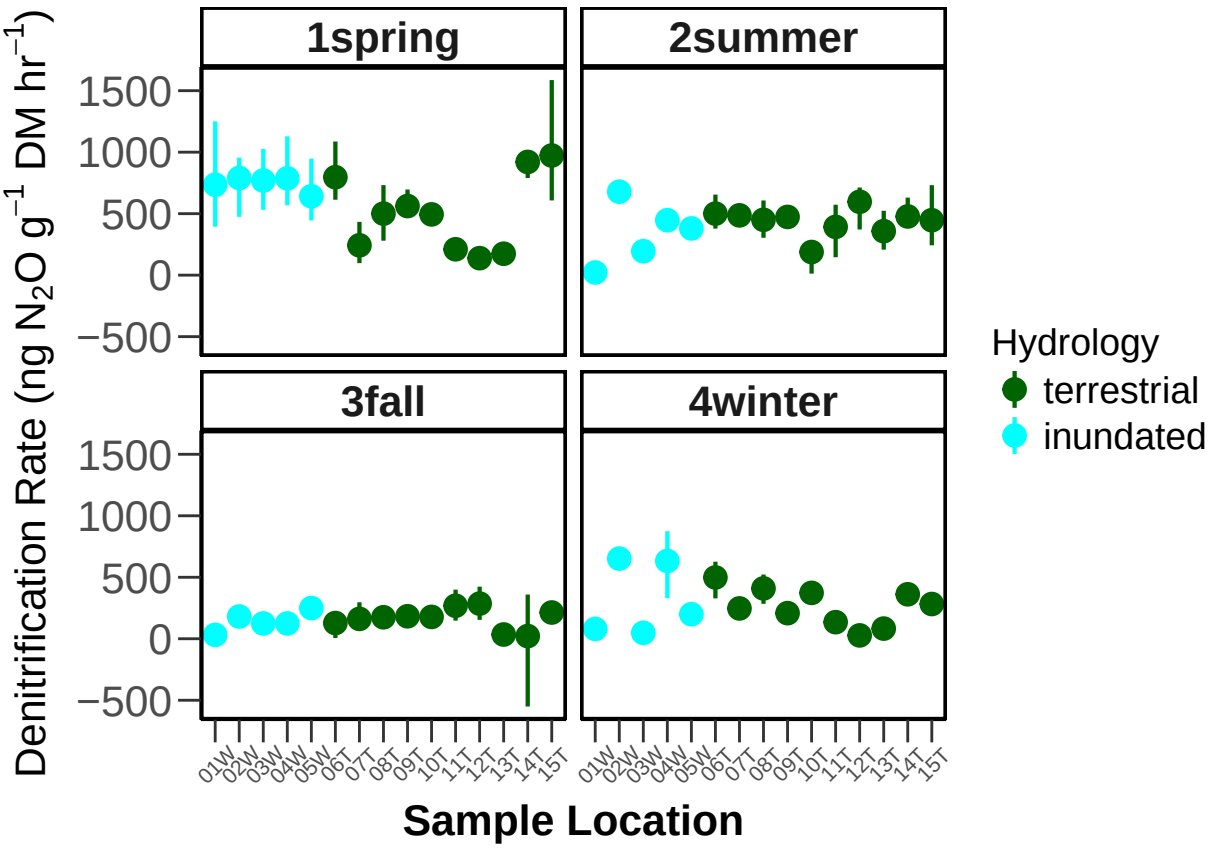



```
anova(DEA.lm)
```

```
## Analysis of Variance Table
##
## Response: y.ng.N2ON.hr
##               Df  Sum Sq Mean Sq F value    Pr(>F)
## sample         14 2363658  168833  5.8635 1.243e-08 ***
```

```
## season          3 4438591 1479530 51.3834 < 2.2e-16 ***
## sample:season  42 4069372   96890  3.3649 1.166e-07 ***
## Residuals     120 3455269   28794
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
p <- ggplot(DEA, aes(x=sample, y=y.ng.N2ON.hr, color=as.factor(hydrology))) + stat_summary(fun.data=mean
p + theme_bw() + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(), axis.lin
```




```
ggsave("../figures/DEApotential_location.pdf", plot=last_plot(), device=NULL, path=NULL, scale=1, width=
```

```
## Saving 6.5 x 4.5 in image
```