Statistical analyses_Github

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Required data sets

```
WD <- ".."
PATH_OUTPUT <- file.path(WD, "Outputs")

NLOG_VE <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE.csv"), head = T)
NLOG_VE_sup_zero <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE_sup_zero.csv"), head = T)
NLOG_VE_sup_zero_Moz <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE_sup_zero_Moz.csv"), head = T)
NLOG_VE_sup_zero_North <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE_sup_zero_North.csv"), head = T)

NLOG_VE_zero <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE_zero.csv"), head = T)

NLOG_VE_zero_Moz <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE_zero_Moz.csv"), head = T)
NLOG_VE_zero_North <- read.csv(file.path(PATH_OUTPUT, "NLOG_VE_zero_North.csv"), head = T)

dfMN_epi<-read.csv(file.path(PATH_OUTPUT, "MN_epi_mean.csv"), header = T)
dfMN_u<-read.csv(file.path(PATH_OUTPUT, "MN_umeso_mean.csv"), header = T)
dfMN_mu<-read.csv(file.path(PATH_OUTPUT, "MN_mumeso_mean.csv"), header = T)
dfMN_ml<-read.csv(file.path(PATH_OUTPUT, "MN_mlmeso_mean.csv"), header = T)
dfMN_hml<-read.csv(file.path(PATH_OUTPUT, "MN_hmlmeso_mean.csv"), header = T)

df_eff <- read.csv(file.path(PATH_OUTPUT, "df_eff.csv"), head = T)
df_eff_new <- read.csv(file.path(PATH_OUTPUT, "df_eff_new_100.csv"), head = T)
df_eff_new_50 <- read.csv(file.path(PATH_OUTPUT, "df_eff_new_50.csv"), head = T)
df_eff_new_150 <- read.csv(file.path(PATH_OUTPUT, "df_eff_new_150.csv"), head = T)

# For the Sensitivity analysis (Oi,d > 10)

NLOG_VE_zero_Moz_10 <- NLOG_VE_zero_Moz[NLOG_VE_zero_Moz$NumOBS>=10,]
NLOG_VE_zero_North_10 <- NLOG_VE_zero_North[NLOG_VE_zero_North$NumOBS>=10,]
NLOG_VE_sup_zero_Moz_10 <- NLOG_VE_sup_zero_Moz[NLOG_VE_sup_zero_Moz$NumOBS>=10,]
NLOG_VE_sup_zero_North_10 <- NLOG_VE_sup_zero_North[NLOG_VE_sup_zero_North$NumOBS>=10,]
```

I : Differences between zones (Wilcoxon tests)

Here, no plots have been made but boxplots could be a good representation

```r
wilcox.test(NLOG_VE_sup_zero_Moz$chlamean, NLOG_VE_sup_zero_North$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_sup_zero_Moz$chlamean and NLOG_VE_sup_zero_North$chlamean
## W = 4797, p-value = 0.1827
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_sup_zero_Moz$slamean, NLOG_VE_sup_zero_North$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_sup_zero_Moz$slamean and NLOG_VE_sup_zero_North$slamean
## W = 3780, p-value = 0.3781
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_sup_zero_Moz$SSCImean, NLOG_VE_sup_zero_North$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_sup_zero_Moz$SSCImean and NLOG_VE_sup_zero_North$SSCImean
## W = 6005, p-value = 7.358e-05
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_sup_zero_Moz$FSLEmean, NLOG_VE_sup_zero_North$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_sup_zero_Moz$FSLEmean and NLOG_VE_sup_zero_North$FSLEmean
## W = 257, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_sup_zero_Moz$MNmean, NLOG_VE_sup_zero_North$MNmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_sup_zero_Moz$MNmean and NLOG_VE_sup_zero_North$MNmean
## W = 5833, p-value = 0.0003311
## alternative hypothesis: true location shift is not equal to 0
```

II : Checking the normal distribution (Shapiro tests)

H0 : the data follows a normal distribution

```r
shapiro.test(NLOG_VE$NLOG_stand)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$NLOG_stand
## W = 0.46653, p-value < 2.2e-16
```

```r
shapiro.test(NLOG_VE$chlamean)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$chlamean
## W = 0.75869, p-value < 2.2e-16
```

```r
shapiro.test(NLOG_VE$sstmean)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$sstmean
## W = 0.96988, p-value = 1.837e-12
```

```r
shapiro.test(NLOG_VE$slamean)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$slamean
## W = 0.99529, p-value = 0.00873
```

```r
shapiro.test(NLOG_VE$SSCImean)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$SSCImean
## W = 0.89761, p-value < 2.2e-16
```

```r
shapiro.test(NLOG_VE$FSLEmean)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$FSLEmean
## W = 0.91901, p-value < 2.2e-16
```

```r
shapiro.test(NLOG_VE$MNmean)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  NLOG_VE$MNmean
## W = 0.92226, p-value < 2.2e-16
```

III : Correlations between Micronecton types (Kendall tests)

Related to Figure A2 and Table A1

```r
df_list<-list(dfMN_epi,dfMN_u,dfMN_mu,dfMN_ml,dfMN_hml)
dftot<-Reduce(function(x, y) merge(x, y, by=c("lat_grid", "lon_grid","year", "month")), df_list)

cor.test(dftot$micronec_epi,dftot$micronec_umeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_epi and dftot$micronec_umeso
## z = 74.856, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##      tau
## 0.294818
```

```r
cor.test(dftot$micronec_epi,dftot$micronec_mumeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_epi and dftot$micronec_mumeso
## z = 147.2, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.5797324
```

```r
cor.test(dftot$micronec_epi,dftot$micronec_mlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_epi and dftot$micronec_mlmeso
## z = 66.482, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##      tau
## 0.261836
```

```
cor.test(dftot$micronec_epi,dftot$micronec_hmlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_epi and dftot$micronec_hmlmeso
## z = 114.15, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.4495617
```

```
cor.test(dftot$micronec_umeso,dftot$micronec_mumeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_umeso and dftot$micronec_mumeso
## z = 110.18, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.4339509
```

```
cor.test(dftot$micronec_umeso,dftot$micronec_mlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_umeso and dftot$micronec_mlmeso
## z = 174.21, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.6861061
```

```
cor.test(dftot$micronec_umeso,dftot$micronec_hmlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_umeso and dftot$micronec_hmlmeso
## z = 55.544, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.2187593
```

```
cor.test(dftot$micronec_mumeso,dftot$micronec_mlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_mumeso and dftot$micronec_mlmeso
## z = 100.46, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.3956415
```

```
cor.test(dftot$micronec_mumeso,dftot$micronec_hmlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_mumeso and dftot$micronec_hmlmeso
## z = 160.17, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##      tau
## 0.630834
```

```
cor.test(dftot$micronec_mlmeso,dftot$micronec_hmlmeso, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  dftot$micronec_mlmeso and dftot$micronec_hmlmeso
## z = 74.65, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.2940077
```

IV : Correlations between environmental variables (Kendall tests)

Related to Figure A3 and Table A2

```
cor.test(NLOG_VE$chlamean, NLOG_VE$sstmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$chlamean and NLOG_VE$sstmean
## z = -27.801, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## -0.6281774
```

```r
cor.test(NLOG_VE$chlamean, NLOG_VE$slamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$chlamean and NLOG_VE$slamean
## z = -8.7996, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## -0.1988312
```

```r
cor.test(NLOG_VE$chlamean, NLOG_VE$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$chlamean and NLOG_VE$SSCImean
## z = 3.8585, p-value = 0.0001141
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.08718457
```

```r
cor.test(NLOG_VE$chlamean, NLOG_VE$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$chlamean and NLOG_VE$FSLEmean
## z = -0.76553, p-value = 0.444
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.01729746
```

```r
cor.test(NLOG_VE$chlamean, NLOG_VE$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$chlamean and NLOG_VE$MNmean
## z = 4.046, p-value = 5.211e-05
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.09142047
```

```r
cor.test(NLOG_VE$sstmean, NLOG_VE$slamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$sstmean and NLOG_VE$slamean
## z = 9.4087, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.2125956
```

```r
cor.test(NLOG_VE$sstmean, NLOG_VE$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$sstmean and NLOG_VE$SSCImean
## z = -3.4449, p-value = 0.0005712
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##      tau
## -0.07784
```

```r
cor.test(NLOG_VE$sstmean, NLOG_VE$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$sstmean and NLOG_VE$FSLEmean
## z = -2.3974, p-value = 0.01651
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.05417031
```

```r
cor.test(NLOG_VE$sstmean, NLOG_VE$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$sstmean and NLOG_VE$MNmean
## z = -0.26774, p-value = 0.7889
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##          tau
## -0.006049795
```

```r
cor.test(NLOG_VE$slamean, NLOG_VE$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
```

```
## data:  NLOG_VE$slamean and NLOG_VE$SSCImean
## z = 3.5526, p-value = 0.0003815
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.08027271
```

```r
cor.test(NLOG_VE$slamean, NLOG_VE$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$slamean and NLOG_VE$FSLEmean
## z = -1.8802, p-value = 0.06008
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.04248498
```

```r
cor.test(NLOG_VE$slamean, NLOG_VE$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$slamean and NLOG_VE$MNmean
## z = -0.97376, p-value = 0.3302
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.02200265
```

```r
cor.test(NLOG_VE$SSCImean, NLOG_VE$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$SSCImean and NLOG_VE$MNmean
## z = -4.9464, p-value = 7.56e-07
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## -0.1117664
```

```r
cor.test(NLOG_VE$FSLEmean, NLOG_VE$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$FSLEmean and NLOG_VE$SSCImean
## z = 2.0827, p-value = 0.03728
## alternative hypothesis: true tau is not equal to 0
```

```
## sample estimates:
##        tau
## 0.04705885
```

```
cor.test(NLOG_VE$FSLEmean, NLOG_VE$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE$FSLEmean and NLOG_VE$MNmean
## z = -12.246, p-value < 2.2e-16
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## -0.2766939
```

V : Differences between the environmental variables according to NLOG = 0 or NLOG > 0 (Wilcoxon tests)

Related to Figure 3

```
wilcox.test(NLOG_VE_zero_Moz$chlamean,NLOG_VE_sup_zero_Moz$chlamean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz$chlamean and NLOG_VE_sup_zero_Moz$chlamean
## W = 101, p-value = 0.4413
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North$chlamean,NLOG_VE_sup_zero_North$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North$chlamean and NLOG_VE_sup_zero_North$chlamean
## W = 84443, p-value = 0.01223
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_Moz$slamean,NLOG_VE_sup_zero_Moz$slamean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz$slamean and NLOG_VE_sup_zero_Moz$slamean
## W = 96, p-value = 0.3458
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North$slamean,NLOG_VE_sup_zero_North$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North$slamean and NLOG_VE_sup_zero_North$slamean
## W = 79708, p-value = 0.2924
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_Moz$SSCImean,NLOG_VE_sup_zero_Moz$SSCImean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz$SSCImean and NLOG_VE_sup_zero_Moz$SSCImean
## W = 76, p-value = 0.09919
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North$SSCImean,NLOG_VE_sup_zero_North$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North$SSCImean and NLOG_VE_sup_zero_North$SSCImean
## W = 84334, p-value = 0.01344
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_Moz$FSLEmean,NLOG_VE_sup_zero_Moz$FSLEmean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz$FSLEmean and NLOG_VE_sup_zero_Moz$FSLEmean
## W = 170, p-value = 0.1148
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North$FSLEmean,NLOG_VE_sup_zero_North$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North$FSLEmean and NLOG_VE_sup_zero_North$FSLEmean
## W = 72834, p-value = 0.2913
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_Moz$MNmean,NLOG_VE_sup_zero_Moz$MNmean)
```

```
##
##  Wilcoxon rank sum test
```

```
##
## data:  NLOG_VE_zero_Moz$MNmean and NLOG_VE_sup_zero_Moz$MNmean
## W = 111, p-value = 0.6697
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North$MNmean,NLOG_VE_sup_zero_North$MNmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North$MNmean and NLOG_VE_sup_zero_North$MNmean
## W = 80846, p-value = 0.1609
## alternative hypothesis: true location shift is not equal to 0
```

Related to Table A3 (Sensitivity Analysis)

```
wilcox.test(NLOG_VE_zero_Moz_10$chlamean,NLOG_VE_sup_zero_Moz_10$chlamean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz_10$chlamean and NLOG_VE_sup_zero_Moz_10$chlamean
## W = 12, p-value = 0.8167
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North_10$chlamean,NLOG_VE_sup_zero_North_10$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North_10$chlamean and NLOG_VE_sup_zero_North_10$chlamean
## W = 20943, p-value = 0.01625
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_Moz_10$slamean,NLOG_VE_sup_zero_Moz_10$slamean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz_10$slamean and NLOG_VE_sup_zero_Moz_10$slamean
## W = 16, p-value = 0.8167
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(NLOG_VE_zero_North_10$slamean,NLOG_VE_sup_zero_North_10$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North_10$slamean and NLOG_VE_sup_zero_North_10$slamean
## W = 19292, p-value = 0.3733
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_zero_Moz_10$SSCImean,NLOG_VE_sup_zero_Moz_10$SSCImean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz_10$SSCImean and NLOG_VE_sup_zero_Moz_10$SSCImean
## W = 6, p-value = 0.2667
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_zero_North_10$SSCImean,NLOG_VE_sup_zero_North_10$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North_10$SSCImean and NLOG_VE_sup_zero_North_10$SSCImean
## W = 19895, p-value = 0.1491
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_zero_Moz_10$FSLEmean,NLOG_VE_sup_zero_Moz_10$FSLEmean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz_10$FSLEmean and NLOG_VE_sup_zero_Moz_10$FSLEmean
## W = 7, p-value = 0.3333
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_zero_North_10$FSLEmean,NLOG_VE_sup_zero_North_10$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North_10$FSLEmean and NLOG_VE_sup_zero_North_10$FSLEmean
## W = 19614, p-value = 0.2359
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_zero_Moz_10$MNmean,NLOG_VE_sup_zero_Moz_10$MNmean)
```

```
##
##  Wilcoxon rank sum test
##
## data:  NLOG_VE_zero_Moz_10$MNmean and NLOG_VE_sup_zero_Moz_10$MNmean
## W = 15, p-value = 0.9333
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(NLOG_VE_zero_North_10$MNmean,NLOG_VE_sup_zero_North_10$MNmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  NLOG_VE_zero_North_10$MNmean and NLOG_VE_sup_zero_North_10$MNmean
## W = 18653, p-value = 0.7606
## alternative hypothesis: true location shift is not equal to 0
```

VI : Correlations between NLOG and VE (Kendall tests)

Related to Figure 4 and Table A4

```
cor.test(NLOG_VE_sup_zero_Moz$NLOG_stand, NLOG_VE_sup_zero_Moz$chlamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz$NLOG_stand and NLOG_VE_sup_zero_Moz$chlamean
## z = 0.13607, p-value = 0.8918
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.01729755
```

```
cor.test(NLOG_VE_sup_zero_North$NLOG_stand, NLOG_VE_sup_zero_North$chlamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North$NLOG_stand and NLOG_VE_sup_zero_North$chlamean
## z = -1.4962, p-value = 0.1346
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.06210949
```

```
cor.test(NLOG_VE_sup_zero_Moz$NLOG_stand, NLOG_VE_sup_zero_Moz$slamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz$NLOG_stand and NLOG_VE_sup_zero_Moz$slamean
## z = 2.4152, p-value = 0.01573
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.3070315
```

```
cor.test(NLOG_VE_sup_zero_North$NLOG_stand, NLOG_VE_sup_zero_North$slamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North$NLOG_stand and NLOG_VE_sup_zero_North$slamean
## z = -2.2274, p-value = 0.02592
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.09246481
```

```r
cor.test(NLOG_VE_sup_zero_Moz$NLOG_stand, NLOG_VE_sup_zero_Moz$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz$NLOG_stand and NLOG_VE_sup_zero_Moz$SSCImean
## z = 0.10205, p-value = 0.9187
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.01297316
```

```r
cor.test(NLOG_VE_sup_zero_North$NLOG_stand, NLOG_VE_sup_zero_North$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North$NLOG_stand and NLOG_VE_sup_zero_North$SSCImean
## z = -1.1883, p-value = 0.2347
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.04932883
```

```r
cor.test(NLOG_VE_sup_zero_Moz$NLOG_stand, NLOG_VE_sup_zero_Moz$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz$NLOG_stand and NLOG_VE_sup_zero_Moz$FSLEmean
## z = 0.95249, p-value = 0.3408
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.1210829
```

```r
cor.test(NLOG_VE_sup_zero_North$NLOG_stand, NLOG_VE_sup_zero_North$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North$NLOG_stand and NLOG_VE_sup_zero_North$FSLEmean
## z = 0.3727, p-value = 0.7094
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.01547132
```

```r
cor.test(NLOG_VE_sup_zero_Moz$NLOG_stand, NLOG_VE_sup_zero_Moz$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz$NLOG_stand and NLOG_VE_sup_zero_Moz$MNmean
## z = -0.23812, p-value = 0.8118
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.03027071
```

```
cor.test(NLOG_VE_sup_zero_North$NLOG_stand, NLOG_VE_sup_zero_North$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North$NLOG_stand and NLOG_VE_sup_zero_North$MNmean
## z = 1.3017, p-value = 0.193
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.0540375
```

Related to Table A5 (Sensitivity Analysis)

```
cor.test(NLOG_VE_sup_zero_Moz_10$NLOG_stand, NLOG_VE_sup_zero_Moz_10$chlamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz_10$NLOG_stand and NLOG_VE_sup_zero_Moz_10$chlamean
## T = 45, p-value = 1
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.01098901
```

```
cor.test(NLOG_VE_sup_zero_North_10$NLOG_stand, NLOG_VE_sup_zero_North_10$chlamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North_10$NLOG_stand and NLOG_VE_sup_zero_North_10$chlamean
## z = -0.81672, p-value = 0.4141
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.04405533
```

```
cor.test(NLOG_VE_sup_zero_Moz_10$NLOG_stand, NLOG_VE_sup_zero_Moz_10$slamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz_10$NLOG_stand and NLOG_VE_sup_zero_Moz_10$slamean
## T = 60, p-value = 0.1268
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.3186813
```

```
cor.test(NLOG_VE_sup_zero_North_10$NLOG_stand, NLOG_VE_sup_zero_North_10$slamean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North_10$NLOG_stand and NLOG_VE_sup_zero_North_10$slamean
## z = -2.5196, p-value = 0.01175
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## -0.1359157
```

```
cor.test(NLOG_VE_sup_zero_Moz_10$NLOG_stand, NLOG_VE_sup_zero_Moz_10$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz_10$NLOG_stand and NLOG_VE_sup_zero_Moz_10$SSCImean
## T = 48, p-value = 0.8299
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.05494505
```

```
cor.test(NLOG_VE_sup_zero_North_10$NLOG_stand, NLOG_VE_sup_zero_North_10$SSCImean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North_10$NLOG_stand and NLOG_VE_sup_zero_North_10$SSCImean
## z = -1.4104, p-value = 0.1584
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.07608109
```

```
cor.test(NLOG_VE_sup_zero_Moz_10$NLOG_stand, NLOG_VE_sup_zero_Moz_10$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
```

```
## data:  NLOG_VE_sup_zero_Moz_10$NLOG_stand and NLOG_VE_sup_zero_Moz_10$FSLEmean
## T = 50, p-value = 0.6672
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##       tau
## 0.0989011
```

```
cor.test(NLOG_VE_sup_zero_North_10$NLOG_stand, NLOG_VE_sup_zero_North_10$FSLEmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North_10$NLOG_stand and NLOG_VE_sup_zero_North_10$FSLEmean
## z = -0.14917, p-value = 0.8814
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##          tau
## -0.008046273
```

```
cor.test(NLOG_VE_sup_zero_Moz_10$NLOG_stand, NLOG_VE_sup_zero_Moz_10$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_Moz_10$NLOG_stand and NLOG_VE_sup_zero_Moz_10$MNmean
## T = 45, p-value = 1
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##         tau
## -0.01098901
```

```
cor.test(NLOG_VE_sup_zero_North_10$NLOG_stand, NLOG_VE_sup_zero_North_10$MNmean, method = "kendall")
```

```
##
##  Kendall's rank correlation tau
##
## data:  NLOG_VE_sup_zero_North_10$NLOG_stand and NLOG_VE_sup_zero_North_10$MNmean
## z = 0.93782, p-value = 0.3483
## alternative hypothesis: true tau is not equal to 0
## sample estimates:
##        tau
## 0.05058795
```

VII : Construction of models

Related to Figure 5, Figure A1, Figure A4 and Table 3

```
NLOG_VE_sup_zero_North$chlacr <- scale(NLOG_VE_sup_zero_North$chlamean)
NLOG_VE_sup_zero_North$slacr <- scale(NLOG_VE_sup_zero_North$slamean)
NLOG_VE_sup_zero_North$SSCIcr <- scale(NLOG_VE_sup_zero_North$SSCImean)
```

```r
NLOG_VE_sup_zero_North$FSLEcr <- scale(NLOG_VE_sup_zero_North$FSLEmean)
NLOG_VE_sup_zero_North$MNcr <- scale(NLOG_VE_sup_zero_North$MNmean)
NLOG_VE_sup_zero_North$logNLOG <- log(NLOG_VE_sup_zero_North$NLOG_stand)

NLOG_VE_sup_zero_Moz$chlacr <- scale(NLOG_VE_sup_zero_Moz$chlamean)
NLOG_VE_sup_zero_Moz$slacr <- scale(NLOG_VE_sup_zero_Moz$slamean)
NLOG_VE_sup_zero_Moz$SSCIcr <- scale(NLOG_VE_sup_zero_Moz$SSCImean)
NLOG_VE_sup_zero_Moz$FSLEcr <- scale(NLOG_VE_sup_zero_Moz$FSLEmean)
NLOG_VE_sup_zero_Moz$MNcr <- scale(NLOG_VE_sup_zero_Moz$MNmean)
NLOG_VE_sup_zero_Moz$logNLOG <- log(NLOG_VE_sup_zero_Moz$NLOG_stand)
```

Linear model for the >10°S zone (North)

```r
LM_North_chla <- lm(logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr, data = NLOG_VE_sup_zero_North)
summary(LM_North_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr,
##     data = NLOG_VE_sup_zero_North)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.63432 -0.42382  0.01529  0.41113  1.39258
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.945243   0.038111 -51.042  < 2e-16 ***
## chlacr      -0.086757   0.041093  -2.111  0.03569 *
## slacr       -0.125327   0.041243  -3.039  0.00261 **
## SSCIcr      -0.057175   0.039946  -1.431  0.15352
## FSLEcr      -0.035422   0.041567  -0.852  0.39490
## MNcr        -0.004671   0.041538  -0.112  0.91054
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6262 on 264 degrees of freedom
## Multiple R-squared:  0.05425,    Adjusted R-squared:  0.03634
## F-statistic: 3.029 on 5 and 264 DF,  p-value: 0.01121
```

```r
stepAIC(LM_North_chla)
```

```
## Start:  AIC=-246.82
## logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr
##
##          Df Sum of Sq    RSS     AIC
## - MNcr    1    0.0050 103.53 -248.80
## - FSLEcr  1    0.2848 103.81 -248.07
## <none>                103.53 -246.82
## - SSCIcr  1    0.8034 104.33 -246.73
```

```
## - chlacr  1    1.7480 105.28 -244.30
## - slacr   1    3.6212 107.15 -239.53
##
## Step:  AIC=-248.8
## logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr
##
##          Df Sum of Sq    RSS     AIC
## - FSLEcr  1    0.2927 103.83 -250.04
## <none>                103.53 -248.80
## - SSCIcr  1    0.8065 104.34 -248.71
## - chlacr  1    1.7463 105.28 -246.29
## - slacr   1    3.6165 107.15 -241.53
##
## Step:  AIC=-250.04
## logNLOG ~ chlacr + slacr + SSCIcr
##
##          Df Sum of Sq    RSS     AIC
## <none>                103.83 -250.04
## - SSCIcr  1    1.0037 104.83 -249.44
## - chlacr  1    1.5971 105.42 -247.92
## - slacr   1    3.3747 107.20 -243.41
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr, data = NLOG_VE_sup_zero_North)
##
## Coefficients:
## (Intercept)       chlacr        slacr       SSCIcr
##    -1.94524     -0.08227     -0.11915     -0.06202
```

```
LM2_North_chla <- lm(logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr, data = NLOG_VE_sup_zero_North)
summary(LM2_North_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr, data = NLOG_VE_sup_zero_North)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.63680 -0.42294  0.01666  0.40919  1.38722
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.94524    0.03804 -51.137  < 2e-16 ***
## chlacr      -0.08671    0.04101  -2.114  0.03543 *
## slacr       -0.12511    0.04112  -3.042  0.00258 **
## SSCIcr      -0.05638    0.03924  -1.437  0.15196
## FSLEcr      -0.03387    0.03913  -0.866  0.38750
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6251 on 265 degrees of freedom
## Multiple R-squared:  0.05421,    Adjusted R-squared:  0.03993
## F-statistic: 3.797 on 4 and 265 DF,  p-value: 0.00508
```

```r
LM3_North_chla <- lm(logNLOG ~ chlacr + slacr + SSCIcr, data = NLOG_VE_sup_zero_North)
summary(LM3_North_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr, data = NLOG_VE_sup_zero_North)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.65378 -0.43897  0.02645  0.41915  1.41580
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.94524    0.03802 -51.162  < 2e-16 ***
## chlacr      -0.08227    0.04067  -2.023  0.04410 *
## slacr       -0.11915    0.04052  -2.940  0.00357 **
## SSCIcr      -0.06202    0.03868  -1.604  0.11000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6248 on 266 degrees of freedom
## Multiple R-squared:  0.05153,    Adjusted R-squared:  0.04084
## F-statistic: 4.818 on 3 and 266 DF,  p-value: 0.002772
```

```r
LM4_North_chla <- lm(logNLOG ~ chlacr + slacr, data = NLOG_VE_sup_zero_North)
summary(LM4_North_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr, data = NLOG_VE_sup_zero_North)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.61352 -0.44007  0.01007  0.42305  1.48592
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.94524    0.03813 -51.012  < 2e-16 ***
## chlacr      -0.09226    0.04031  -2.289  0.02289 *
## slacr       -0.12740    0.04031  -3.160  0.00176 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6266 on 267 degrees of freedom
## Multiple R-squared:  0.04236,    Adjusted R-squared:  0.03519
## F-statistic: 5.906 on 2 and 267 DF,  p-value: 0.003092
```

Linear model for the <10°S zone (Moz)

```r
LM_Moz_chla <- lm(logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr, data = NLOG_VE_sup_zero_Moz)
summary(LM_Moz_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr,
##     data = NLOG_VE_sup_zero_Moz)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.4715 -0.6300  0.1197  0.4765  1.5835
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.69572    0.13991  -4.973    4e-05 ***
## chlacr       0.10054    0.25507   0.394   0.6968
## slacr        0.43936    0.17342   2.534   0.0179 *
## SSCIcr      -0.30436    0.20373  -1.494   0.1477
## FSLEcr      -0.03387    0.17002  -0.199   0.8437
## MNcr        -0.32920    0.27349  -1.204   0.2400
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.779 on 25 degrees of freedom
## Multiple R-squared:  0.2416, Adjusted R-squared:  0.08992
## F-statistic: 1.593 on 5 and 25 DF,  p-value: 0.1986
```

```r
stepAIC(LM_Moz_chla)
```

```
## Start:  AIC=-10.15
## logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr
##
##          Df Sum of Sq    RSS      AIC
## - FSLEcr  1    0.0241 15.195 -12.1041
## - chlacr  1    0.0943 15.265 -11.9612
## - MNcr    1    0.8792 16.050 -10.4068
## <none>                15.171 -10.1533
## - SSCIcr  1    1.3544 16.525  -9.5023
## - slacr   1    3.8952 19.066  -5.0687
##
## Step:  AIC=-12.1
## logNLOG ~ chlacr + slacr + SSCIcr + MNcr
##
##          Df Sum of Sq    RSS      AIC
## - chlacr  1    0.0778 15.273 -13.9459
## - MNcr    1    0.8617 16.056 -12.3942
## <none>                15.195 -12.1041
## - SSCIcr  1    1.5405 16.735 -11.1105
## - slacr   1    4.3740 19.569  -6.2616
##
## Step:  AIC=-13.95
## logNLOG ~ slacr + SSCIcr + MNcr
```

```
##
##          Df Sum of Sq    RSS      AIC
## <none>                 15.273 -13.9459
## - MNcr    1    1.2855 16.558 -13.4407
## - SSCIcr  1    1.5186 16.791 -13.0072
## - slacr   1    4.3054 19.578  -8.2472
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz)
##
## Coefficients:
## (Intercept)        slacr       SSCIcr         MNcr
##     -0.6957       0.4203      -0.2827      -0.2418
```

```
LM2_Moz_chla <- lm(logNLOG ~ chlacr + slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz)
summary(LM2_Moz_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.5012 -0.6008  0.1150  0.4633  1.5958
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.69572    0.13730  -5.067 2.82e-05 ***
## chlacr       0.08885    0.24360   0.365   0.7182
## slacr        0.42531    0.15546   2.736   0.0111 *
## SSCIcr      -0.28492    0.17549  -1.624   0.1165
## MNcr        -0.31563    0.25994  -1.214   0.2356
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7645 on 26 degrees of freedom
## Multiple R-squared:  0.2404, Adjusted R-squared:  0.1235
## F-statistic: 2.057 on 4 and 26 DF,  p-value: 0.1156
```

```
LM3_Moz_chla <- lm(logNLOG ~ slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz)
summary(LM3_Moz_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.47876 -0.59818  0.09487  0.49096  1.61276
##
## Coefficients:
```

```
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.6957     0.1351  -5.150 2.03e-05 ***
## slacr         0.4203     0.1524   2.759   0.0103 *
## SSCIcr       -0.2827     0.1725  -1.639   0.1129
## MNcr         -0.2418     0.1604  -1.507   0.1433
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7521 on 27 degrees of freedom
## Multiple R-squared:  0.2365, Adjusted R-squared:  0.1517
## F-statistic: 2.788 on 3 and 27 DF,  p-value: 0.05976
```

```
LM4_Moz_chla <- lm(logNLOG ~ slacr + SSCIcr, data = NLOG_VE_sup_zero_Moz)
summary(LM4_Moz_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr + SSCIcr, data = NLOG_VE_sup_zero_Moz)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.4896 -0.6056  0.1438  0.4021  1.6381
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.6957     0.1381  -5.037 2.51e-05 ***
## slacr         0.3644     0.1511   2.412   0.0227 *
## SSCIcr       -0.1484     0.1511  -0.982   0.3343
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.769 on 28 degrees of freedom
## Multiple R-squared:  0.1722, Adjusted R-squared:  0.1131
## F-statistic: 2.913 on 2 and 28 DF,  p-value: 0.07089
```

```
LM5_Moz_chla <- lm(logNLOG ~ slacr, data = NLOG_VE_sup_zero_Moz)
summary(LM5_Moz_chla)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr, data = NLOG_VE_sup_zero_Moz)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.7310 -0.5754  0.1378  0.4193  1.5177
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.6957     0.1380  -5.040 2.27e-05 ***
## slacr         0.3096     0.1403   2.206   0.0354 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Residual standard error: 0.7685 on 29 degrees of freedom
## Multiple R-squared:  0.1437, Adjusted R-squared:  0.1142
## F-statistic: 4.867 on 1 and 29 DF,  p-value: 0.03545
```

Related to Table A6 (Sensitivity analysis)

```
NLOG_VE_sup_zero_North_10$chlacr <- scale(NLOG_VE_sup_zero_North_10$chlamean)
NLOG_VE_sup_zero_North_10$slacr <- scale(NLOG_VE_sup_zero_North_10$slamean)
NLOG_VE_sup_zero_North_10$SSCIcr <- scale(NLOG_VE_sup_zero_North_10$SSCImean)
NLOG_VE_sup_zero_North_10$FSLEcr <- scale(NLOG_VE_sup_zero_North_10$FSLEmean)
NLOG_VE_sup_zero_North_10$MNcr <- scale(NLOG_VE_sup_zero_North_10$MNmean)
NLOG_VE_sup_zero_North_10$logNLOG <- log(NLOG_VE_sup_zero_North_10$NLOG_stand)

LM_North_chla_10 <- lm(logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr, data = NLOG_VE_sup_zero_North
summary(LM_North_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr,
##     data = NLOG_VE_sup_zero_North_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.45771 -0.50415 -0.04823  0.38847  1.59035
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.14786    0.05152 -41.691  < 2e-16 ***
## chlacr      -0.08549    0.05676  -1.506  0.13413
## slacr       -0.17669    0.05862  -3.014  0.00302 **
## SSCIcr      -0.05316    0.05481  -0.970  0.33365
## FSLEcr      -0.06643    0.05860  -1.134  0.25867
## MNcr        -0.01512    0.05691  -0.266  0.79079
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6517 on 154 degrees of freedom
## Multiple R-squared:  0.07509,    Adjusted R-squared:  0.04506
## F-statistic: 2.501 on 5 and 154 DF,  p-value: 0.03296
```

```
LM2_North_chla_10 <- lm(logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr, data = NLOG_VE_sup_zero_North_10)
summary(LM2_North_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr, data = NLOG_VE_sup_zero_North_10)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.4666 -0.5017 -0.0445  0.3888  1.5717
##
## Coefficients:
```

```
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.14786    0.05136 -41.817  < 2e-16 ***
## chlacr      -0.08457    0.05649  -1.497  0.13641
## slacr       -0.17586    0.05836  -3.013  0.00302 **
## SSCIcr      -0.05080    0.05392  -0.942  0.34765
## FSLEcr      -0.06084    0.05453  -1.116  0.26622
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6497 on 155 degrees of freedom
## Multiple R-squared:  0.07467,    Adjusted R-squared:  0.05079
## F-statistic: 3.127 on 4 and 155 DF,  p-value: 0.01659
```

```
LM3_North_chla_10 <- lm(logNLOG ~ chlacr + slacr + FSLEcr, data = NLOG_VE_sup_zero_North_10)
summary(LM3_North_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + FSLEcr, data = NLOG_VE_sup_zero_North_10)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.4358 -0.4828 -0.0568  0.4069  1.6088
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.14786    0.05135 -41.832  < 2e-16 ***
## chlacr      -0.09442    0.05549  -1.702  0.09083 .
## slacr       -0.18890    0.05668  -3.333  0.00107 **
## FSLEcr      -0.07177    0.05326  -1.347  0.17979
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6495 on 156 degrees of freedom
## Multiple R-squared:  0.06937,    Adjusted R-squared:  0.05147
## F-statistic: 3.876 on 3 and 156 DF,  p-value: 0.01044
```

```
LM4_North_chla_10 <- lm(logNLOG ~ chlacr + slacr, data = NLOG_VE_sup_zero_North_10)
summary(LM4_North_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr, data = NLOG_VE_sup_zero_North_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.46401 -0.46228 -0.07624  0.41669  1.56878
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.14786    0.05148 -41.723  < 2e-16 ***
## chlacr      -0.08360    0.05505  -1.519  0.13088
## slacr       -0.16997    0.05505  -3.088  0.00239 **
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6512 on 157 degrees of freedom
## Multiple R-squared:  0.05854,    Adjusted R-squared:  0.04655
## F-statistic: 4.881 on 2 and 157 DF,  p-value: 0.00878
```

```
LM5_North_chla_10 <- lm(logNLOG ~ slacr, data = NLOG_VE_sup_zero_North_10)
summary(LM5_North_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr, data = NLOG_VE_sup_zero_North_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.48800 -0.49092 -0.09125  0.46222  1.62824
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.14786    0.05169 -41.552  < 2e-16 ***
## slacr       -0.14101    0.05185  -2.719  0.00727 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6538 on 158 degrees of freedom
## Multiple R-squared:  0.04471,    Adjusted R-squared:  0.03866
## F-statistic: 7.395 on 1 and 158 DF,  p-value: 0.007273
```

```
NLOG_VE_sup_zero_Moz_10$chlacr <- scale(NLOG_VE_sup_zero_Moz_10$chlamean)
NLOG_VE_sup_zero_Moz_10$slacr <- scale(NLOG_VE_sup_zero_Moz_10$slamean)
NLOG_VE_sup_zero_Moz_10$SSCIcr <- scale(NLOG_VE_sup_zero_Moz_10$SSCImean)
NLOG_VE_sup_zero_Moz_10$FSLEcr <- scale(NLOG_VE_sup_zero_Moz_10$FSLEmean)
NLOG_VE_sup_zero_Moz_10$MNcr <- scale(NLOG_VE_sup_zero_Moz_10$MNmean)
NLOG_VE_sup_zero_Moz_10$logNLOG <- log(NLOG_VE_sup_zero_Moz_10$NLOG_stand)

LM_Moz_chla_10 <- lm(logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
summary(LM_Moz_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + FSLEcr + MNcr,
##     data = NLOG_VE_sup_zero_Moz_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.12851 -0.41877  0.04339  0.35694  1.21036
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.44312    0.21967  -2.017   0.0784 .
## chlacr       0.16459    0.27460   0.599   0.5655
## slacr        0.29006    0.26737   1.085   0.3096
```

```
## SSCIcr      -0.20297    0.29208  -0.695   0.5068
## FSLEcr       0.02013    0.32786   0.061   0.9525
## MNcr        -0.34025    0.39769  -0.856   0.4171
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8219 on 8 degrees of freedom
## Multiple R-squared:  0.188,  Adjusted R-squared:  -0.3195
## F-statistic: 0.3705 on 5 and 8 DF,  p-value: 0.8555
```

```
LM2_Moz_chla_10 <- lm(logNLOG ~ chlacr + slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
summary(LM2_Moz_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ chlacr + slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.13496 -0.40338  0.04165  0.35748  1.20849
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.4431     0.2072  -2.139   0.0611 .
## chlacr        0.1634     0.2583   0.633   0.5428
## slacr         0.2949     0.2409   1.224   0.2519
## SSCIcr       -0.2050     0.2737  -0.749   0.4731
## MNcr         -0.3287     0.3307  -0.994   0.3462
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7751 on 9 degrees of freedom
## Multiple R-squared:  0.1876, Adjusted R-squared:  -0.1734
## F-statistic: 0.5196 on 4 and 9 DF,  p-value: 0.724
```

```
LM3_Moz_chla_10 <- lm(logNLOG ~ slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
summary(LM3_Moz_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr + SSCIcr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.17001 -0.37633  0.08566  0.47975  1.00725
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.4431     0.2008  -2.206   0.0519 .
## slacr         0.3006     0.2334   1.288   0.2268
## SSCIcr       -0.1832     0.2633  -0.696   0.5025
## MNcr         -0.2302     0.2828  -0.814   0.4347
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7515 on 10 degrees of freedom
## Multiple R-squared:  0.1515, Adjusted R-squared:  -0.103
## F-statistic: 0.5952 on 3 and 10 DF,  p-value: 0.6323
```

```
LM4_Moz_chla_10 <- lm(logNLOG ~ slacr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
summary(LM4_Moz_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr + MNcr, data = NLOG_VE_sup_zero_Moz_10)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.2103 -0.2840  0.1214  0.5201  1.0904
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.4431     0.1961  -2.260   0.0451 *
## slacr         0.2548     0.2186   1.166   0.2684
## MNcr         -0.1100     0.2186  -0.503   0.6249
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7337 on 11 degrees of freedom
## Multiple R-squared:  0.1104, Adjusted R-squared:  -0.0513
## F-statistic: 0.6828 on 2 and 11 DF,  p-value: 0.5254
```

```
LM5_Moz_chla_10 <- lm(logNLOG ~ slacr, data = NLOG_VE_sup_zero_Moz_10)
summary(LM5_Moz_chla_10)
```

```
##
## Call:
## lm(formula = logNLOG ~ slacr, data = NLOG_VE_sup_zero_Moz_10)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.09691 -0.18624  0.09067  0.51312  1.00997
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.4431     0.1899  -2.334   0.0378 *
## slacr         0.2146     0.1970   1.089   0.2974
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7105 on 12 degrees of freedom
## Multiple R-squared:  0.08998,    Adjusted R-squared:  0.01414
## F-statistic: 1.186 on 1 and 12 DF,  p-value: 0.2974
```

VIII : Sampling bias analysis (Wilcoxon tests)

Related to Figure B1 and Table B1

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$chlamean,
            df_eff_new[df_eff_new$Zone=="Moz",]$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new[df_eff_new$Zone
## W = 56620, p-value = 5.017e-08
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$chlamean,
            df_eff_new[df_eff_new$Zone=="Above_10S",]$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new[df_eff_ne
## W = 2557336, p-value = 7.101e-14
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$slamean,
            df_eff_new[df_eff_new$Zone=="Moz",]$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new[df_eff_new$Zone
## W = 25298, p-value = 0.0004887
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$slamean,
            df_eff_new[df_eff_new$Zone=="Above_10S",]$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new[df_eff_ne
## W = 2137026, p-value = 0.1654
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$SSCImean,
            df_eff_new[df_eff_new$Zone=="Moz",]$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new[df_eff_new$Zone
## W = 43741, p-value = 0.0758
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$SSCImean,
            df_eff_new[df_eff_new$Zone=="Above_10S",]$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new[df_eff_ne
## W = 2288471, p-value = 0.07029
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$FSLEmean,
            df_eff_new[df_eff_new$Zone=="Moz",]$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new[df_eff_new$Zone
## W = 16705, p-value = 2.869e-09
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$FSLEmean,
            df_eff_new[df_eff_new$Zone=="Above_10S",]$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new[df_eff_ne
## W = 2241418, p-value = 0.4141
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$micronec_epi,
            df_eff_new[df_eff_new$Zone=="Moz",]$micronec_epi)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new[df_eff_new$Zone
## W = 48289, p-value = 0.002116
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$micronec_epi,
            df_eff_new[df_eff_new$Zone=="Above_10S",]$micronec_epi)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new[df_eff_ne
## W = 2297977, p-value = 0.04435
## alternative hypothesis: true location shift is not equal to 0
```

```r
#### Medians ####

## CHLA
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$chlamean)
```

```
## [1] 0.1257596
```

```r
median(df_eff_new[df_eff_new$Zone=="Moz",]$chlamean)
```

```
## [1] 0.08913168
```

```r
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$chlamean)
```

```
## [1] 0.136388
```

```r
median(df_eff_new[df_eff_new$Zone=="Above_10S",]$chlamean)
```

```
## [1] 0.1165741
```

```r
##SLA
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$slamean)
```

```
## [1] 0.05261875
```

```r
median(df_eff_new[df_eff_new$Zone=="Moz",]$slamean)
```

```
## [1] 0.0916
```

```r
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$slamean)
```

```
## [1] 0.07872656
```

```r
median(df_eff_new[df_eff_new$Zone=="Above_10S",]$slamean)
```

```
## [1] 0.08061172
```

```r
## SSCI
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$SSCImean)
```

```
## [1] 0.1988864
```

```r
median(df_eff_new[df_eff_new$Zone=="Moz",]$SSCImean)
```

```
## [1] 0.171358
```

```r
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$SSCImean)
```

```
## [1] 0.150017
```

```r
median(df_eff_new[df_eff_new$Zone=="Above_10S",]$SSCImean)
```

```
## [1] 0.1404724
```

```r
## FSLE
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$FSLEmean)
```

```
## [1] -0.08792684
```

```r
median(df_eff_new[df_eff_new$Zone=="Moz",]$FSLEmean)
```

```
## [1] -0.05425415
```

```r
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$FSLEmean)
```

```
## [1] -0.04729317
```

```r
median(df_eff_new[df_eff_new$Zone=="Above_10S",]$FSLEmean)
```

```
## [1] -0.04796686
```

```r
## MN
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$micronec_epi)
```

```
## [1] 0.4471993
```

```r
median(df_eff_new[df_eff_new$Zone=="Moz",]$micronec_epi)
```

```
## [1] 0.3700588
```

```r
median(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$micronec_epi)
```

```
## [1] 0.3779635
```

```r
median(df_eff_new[df_eff_new$Zone=="Above_10S",]$micronec_epi)
```

```
## [1] 0.3676887
```

Related to Table B2 (Sensitivity analysis of the sampled size)

```r
# Sampled size = 50

wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$chlamean,
            df_eff_new_50[df_eff_new_50$Zone=="Moz",]$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_50[df_eff_new_5
## W = 29183, p-value = 1.17e-08
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$chlamean,
            df_eff_new_50[df_eff_new_50$Zone=="Above_10S",]$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_50[df_ef
## W = 1269572, p-value = 6.509e-12
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$slamean,
            df_eff_new_50[df_eff_new_50$Zone=="Moz",]$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_50[df_eff_new_5
## W = 12822, p-value = 0.0005888
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$slamean,
            df_eff_new_50[df_eff_new_50$Zone=="Above_10S",]$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_50[df_ef
## W = 1048082, p-value = 0.05296
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$SSCImean,
            df_eff_new_50[df_eff_new_50$Zone=="Moz",]$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_50[df_eff_new_5
## W = 22457, p-value = 0.05165
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$SSCImean,
            df_eff_new_50[df_eff_new_50$Zone=="Above_10S",]$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_50[df_ef
## W = 1152155, p-value = 0.02772
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$FSLEmean,
            df_eff_new_50[df_eff_new_50$Zone=="Moz",]$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_50[df_eff_new_
## W = 8040, p-value = 1.006e-09
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$FSLEmean,
            df_eff_new_50[df_eff_new_50$Zone=="Above_10S",]$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_50[df_ef
## W = 1154138, p-value = 0.02261
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$micronec_epi,
            df_eff_new_50[df_eff_new_50$Zone=="Moz",]$micronec_epi)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_50[df_eff_new_
## W = 24796, p-value = 0.001142
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$micronec_epi,
            df_eff_new_50[df_eff_new_50$Zone=="Above_10S",]$micronec_epi)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_50[df_ef
## W = 1118172, p-value = 0.395
## alternative hypothesis: true location shift is not equal to 0
```

```r
# Sampled size = 150

wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$chlamean,
            df_eff_new_150[df_eff_new_150$Zone=="Moz",]$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_150[df_eff_new_
## W = 86969, p-value = 3.262e-08
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$chlamean,
            df_eff_new_150[df_eff_new_150$Zone=="Above_10S",]$chlamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_150[df_ef
## W = 3787786, p-value = 1.64e-13
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$slamean,
            df_eff_new_150[df_eff_new_150$Zone=="Moz",]$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_150[df_eff_new_
## W = 39283, p-value = 0.0006875
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$slamean,
            df_eff_new_150[df_eff_new_150$Zone=="Above_10S",]$slamean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_150[df_ef
## W = 3151606, p-value = 0.06359
## alternative hypothesis: true location shift is not equal to 0
```

```r
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$SSCImean,
            df_eff_new_150[df_eff_new_150$Zone=="Moz",]$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_150[df_eff_new_
## W = 68544, p-value = 0.03756
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$SSCImean,
            df_eff_new_150[df_eff_new_150$Zone=="Above_10S",]$SSCImean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_150[df_e
## W = 3428013, p-value = 0.03114
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$FSLEmean,
            df_eff_new_150[df_eff_new_150$Zone=="Moz",]$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_150[df_eff_new_
## W = 24954, p-value = 1.238e-09
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$FSLEmean,
            df_eff_new_150[df_eff_new_150$Zone=="Above_10S",]$FSLEmean)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_150[df_e
## W = 3381546, p-value = 0.1386
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Moz",]$micronec_epi,
            df_eff_new_150[df_eff_new_150$Zone=="Moz",]$micronec_epi)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Moz",  and df_eff_new_150[df_eff_new_
## W = 74139, p-value = 0.00177
## alternative hypothesis: true location shift is not equal to 0
```

```
wilcox.test(df_eff[df_eff$threshold=="Fisheries" & df_eff$Zone=="Above_10S",]$micronec_epi,
            df_eff_new_150[df_eff_new_150$Zone=="Above_10S",]$micronec_epi)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  df_eff[df_eff$threshold == "Fisheries" & df_eff$Zone == "Above_10S",  and df_eff_new_150[df_e
## W = 3388090, p-value = 0.115
## alternative hypothesis: true location shift is not equal to 0
```