

# 1 Between-bay comparisons

Table 1: Inter-bay differences for median depth of colonization and light requirements. Gaussian models with nuggets for the spatial correlation structures were used. Tampa Bay data were masked to remove points farther than 1km from seagrass.

	<i>Dependent variable:</i>	
	z_c_all	light
	(1)	(2)
baychoc	2.033 (0.119)	49.743 (2.997)
bayirl	1.098 (0.109)	17.731 (2.853)
baytb	1.158 (0.097)	40.816 (2.520)
Observations	518	518
Log Likelihood	170.629	-1,685.096
Akaike Inf. Crit.	-327.259	3,384.193
Bayesian Inf. Crit.	-297.550	3,413.902
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

```
library(multcomp)
summary(glht(zmall, linfct = mcp(bay = 'Tukey'))))

##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: lme.formula(fixed = z_c_all ~ 0 + bay, data = all_light, random = ~1 |
## bay, correlation = corGaus(form = ~Latitude + Longitude |
## bay, nugget = TRUE))
##
## Linear Hypotheses:
## Estimate Std. Error z value Pr(>|z|)
## irl - choc == 0 -0.93416 0.16081 -5.809 <1e-05 ***
```

```
## tb - choc == 0  -0.87432    0.15340  -5.700   <1e-05 ***
## tb - irl == 0   0.05984    0.14569   0.411    0.911
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## (Adjusted p values reported -- single-step method)

summary(glht(lmall, linfct = mcp(bay = 'Tukey'))))

##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: lme.formula(fixed = light ~ 0 + bay, data = all_light, random = ~1 |
##      bay, correlation = corGaus(form = ~Latitude + Longitude |
##      bay, nugget = TRUE))
##
## Linear Hypotheses:
##              Estimate Std. Error z value Pr(>|z|)
## irl - choc == 0  -32.011      4.138  -7.736  <0.001 ***
## tb - choc == 0   -8.927      3.915  -2.280  0.0586 .
## tb - irl == 0    23.085      3.807   6.064  <0.001 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## (Adjusted p values reported -- single-step method)
```

## 2 Within-bay comparisons

Table 2: Linears models of depth of colonization and light requirements comparing bay segments of Tampa Bay. Models have no intercept, a random segment effect, and a Gaussian correlation structure to control for spatial effects (nugget, separate for each bay). Data were masked to remove points farther than 1km from seagrass.

	<i>Dependent variable:</i>	
	z_c.all	light
	(1)	(2)
segHB	1.075 (0.128)	34.084 (7.320)
segLTB	1.294 (0.108)	39.990 (6.096)
segMTB	1.373 (0.102)	36.077 (5.656)
segOTB	0.840 (0.107)	48.855 (6.013)
Observations	218	218
Log Likelihood	369.383	−709.479
Akaike Inf. Crit.	−722.766	1,434.959
Bayesian Inf. Crit.	−695.838	1,461.886
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

Table 3: Linears models of depth of colonization and light requirements comparing bay segments of Choctawhatchee Bay. Models have no intercept, a random segment effect, and a Gaussian correlation structure to control for spatial effects (nugget, separate for each bay).

	<i>Dependent variable:</i>	
	z_c_all	light
	(1)	(2)
segCCB	1.991 (0.203)	50.644 (4.523)
segECB	0.862 (0.412)	63.981 (9.167)
segWCB	2.336 (0.234)	45.808 (5.164)
Observations	255	255
Log Likelihood	86.461	−782.632
Akaike Inf. Crit.	−158.922	1,579.265
Bayesian Inf. Crit.	−134.216	1,603.971
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

Table 4: Linears models of depth of colonization and light requirements comparing bay segments of Indian River Lagoon. Models have no intercept, a random segment effect, and a Gaussian correlation structure to control for spatial effects (nugget, separate for each bay).

	<i>Dependent variable:</i>	
	z.c.all	light
	(1)	(2)
segBR	1.021 (0.275)	20.746 (7.814)
segLCIRL	1.212 (0.233)	13.619 (6.690)
segLIRL	1.545 (0.275)	9.197 (7.397)
segLML	0.981 (0.272)	22.147 (7.180)
segUCIRL	0.932 (0.233)	20.018 (6.654)
segUIRL	1.030 (0.282)	24.091 (8.948)
segUML	0.775 (0.254)	23.552 (7.180)
Observations	45	45
Log Likelihood	59.214	−128.060
Akaike Inf. Crit.	−96.427	278.121
Bayesian Inf. Crit.	−78.414	296.134
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

```

library(multcomp)
zc1 <- glht(zc1, linfct = mcp(seg = 'Tukey'))
summary(zc1)

##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: lme.formula(fixed = z_c_all ~ 0 + seg, data = tb_light, random = ~1 |
## seg, correlation = corGaus(form = ~Latitude + Longitude |
## seg, nugget = TRUE))
##
## Linear Hypotheses:
##
## Estimate Std. Error z value Pr(>|z|)
## LTB - HB == 0 0.21927 0.16785 1.306 0.55790
## MTB - HB == 0 0.29853 0.16375 1.823 0.26158
## OTB - HB == 0 -0.23503 0.16718 -1.406 0.49468
## MTB - LTB == 0 0.07926 0.14849 0.534 0.95069
## OTB - LTB == 0 -0.45430 0.15227 -2.984 0.01531 *
## OTB - MTB == 0 -0.53357 0.14774 -3.611 0.00188 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## (Adjusted p values reported -- single-step method)

cld(zc1)

## HB LTB MTB OTB
## "ab" "b" "b" "a"

summary(glht(lm1, linfct = mcp(seg = 'Tukey'))))

##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: lme.formula(fixed = light ~ 0 + seg, data = tb_light, random = ~1 |

```

```
##      seg, correlation = corGaus(form = ~Latitude + Longitude |
##      seg, nugget = TRUE))
##
## Linear Hypotheses:
##              Estimate Std. Error z value Pr(>|z|)
## LTB - HB == 0      5.906      9.526   0.620   0.925
## MTB - HB == 0      1.993      9.250   0.215   0.996
## OTB - HB == 0     14.771      9.473   1.559   0.401
## MTB - LTB == 0     -3.913      8.316  -0.471   0.965
## OTB - LTB == 0      8.865      8.563   1.035   0.728
## OTB - MTB == 0     12.778      8.255   1.548   0.408
## (Adjusted p values reported -- single-step method)

zc2 <- glht(zc2, linfct = mcp(seg = 'Tukey'))
summary(zc2)

##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: lme.formula(fixed = z_c_all ~ 0 + seg, data = choc_light, random = ~1 |
##      seg, correlation = corGaus(form = ~Latitude + Longitude |
##      seg, nugget = TRUE))
##
## Linear Hypotheses:
##              Estimate Std. Error z value Pr(>|z|)
## ECB - CCB == 0    -1.1293      0.4588  -2.461  0.03549 *
## WCB - CCB == 0     0.3448      0.3096   1.114  0.49901
## WCB - ECB == 0     1.4741      0.4733   3.115  0.00492 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## (Adjusted p values reported -- single-step method)

cld(zc2)

## CCB ECB WCB
## "b" "a" "b"

summary(glht(lm2, linfct = mcp(seg = 'Tukey')))
```

```
##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
## Fit: lme.formula(fixed = light ~ 0 + seg, data = choc_light, random = ~1 |
## seg, correlation = corGaus(form = ~Latitude + Longitude |
## seg, nugget = TRUE))
##
## Linear Hypotheses:
## Estimate Std. Error z value Pr(>|z|)
## ECB - CCB == 0 13.337 10.222 1.305 0.386
## WCB - CCB == 0 -4.836 6.864 -0.704 0.757
## WCB - ECB == 0 -18.173 10.522 -1.727 0.190
## (Adjusted p values reported -- single-step method)

zc3 <- glht(zc3, linfct = mcp(seg = 'Tukey'))
summary(zc3)

##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
## Fit: lme.formula(fixed = z_c_all ~ 0 + seg, data = irl_light, random = ~1 |
## seg, correlation = corGaus(form = ~Latitude + Longitude |
## seg, nugget = TRUE))
##
## Linear Hypotheses:
## Estimate Std. Error z value Pr(>|z|)
## LCIRL - BR == 0 0.190379 0.360031 0.529 0.998
## LIRL - BR == 0 0.523831 0.388774 1.347 0.829
## LML - BR == 0 -0.040662 0.386613 -0.105 1.000
## UCIRL - BR == 0 -0.088792 0.360395 -0.246 1.000
## UIRL - BR == 0 0.008486 0.393707 0.022 1.000
## UML - BR == 0 -0.246138 0.374128 -0.658 0.995
## LIRL - LCIRL == 0 0.333452 0.360185 0.926 0.968
## LML - LCIRL == 0 -0.231041 0.357851 -0.646 0.995
## UCIRL - LCIRL == 0 -0.279171 0.329351 -0.848 0.980
## UIRL - LCIRL == 0 -0.181893 0.365504 -0.498 0.999
## UML - LCIRL == 0 -0.436517 0.344325 -1.268 0.866
```



```
## LML - LIRL == 0      -0.564493    0.386756   -1.460    0.768
## UCIRL - LIRL == 0    -0.612623    0.360549   -1.699    0.616
## UIRL - LIRL == 0     -0.515345    0.393848   -1.308    0.848
## UML - LIRL == 0      -0.769968    0.374276   -2.057    0.377
## UCIRL - LML == 0     -0.048130    0.358217   -0.134    1.000
## UIRL - LML == 0       0.049148    0.391715    0.125    1.000
## UML - LML == 0       -0.205476    0.372031   -0.552    0.998
## UIRL - UCIRL == 0     0.097279    0.365863    0.266    1.000
## UML - UCIRL == 0     -0.157345    0.344705   -0.456    0.999
## UML - UIRL == 0      -0.254624    0.379398   -0.671    0.994
## (Adjusted p values reported -- single-step method)
```

```
cld(zc3)
```

```
##      BR LCIRL  LIRL   LML UCIRL  UIRL   UML
##      "a"  "a"   "a"   "a"  "a"   "a"   "a"
```

```
summary(glht(lm3, linfct = mcp(seg = 'Tukey')))
```

```
##
## Simultaneous Tests for General Linear Hypotheses
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: lme.formula(fixed = light ~ 0 + seg, data = irl_light, random = ~1 |
##      seg, correlation = corGaus(form = ~Latitude + Longitude |
##      seg, nugget = TRUE))
##
## Linear Hypotheses:
##
##              Estimate Std. Error z value Pr(>|z|)
## LCIRL - BR == 0      -7.1268    10.2864  -0.693    0.993
## LIRL - BR == 0      -11.5483    10.7595  -1.073    0.935
## LML - BR == 0         1.4016    10.6112   0.132    1.000
## UCIRL - BR == 0      -0.7274    10.2631  -0.071    1.000
## UIRL - BR == 0        3.3456    11.8790   0.282    1.000
## UML - BR == 0         2.8061    10.6112   0.264    1.000
## LIRL - LCIRL == 0    -4.4215     9.9736  -0.443    0.999
## LML - LCIRL == 0      8.5284     9.8135   0.869    0.977
## UCIRL - LCIRL == 0    6.3994     9.4360   0.678    0.994
## UIRL - LCIRL == 0   10.4724    11.1722   0.937    0.966
```

```

## UML - LCIRL == 0      9.9329      9.8135      1.012      0.951
## LML - LIRL == 0      12.9499     10.3083      1.256      0.871
## UCIRL - LIRL == 0    10.8210      9.9496      1.088      0.931
## UIRL - LIRL == 0     14.8939     11.6092      1.283      0.859
## UML - LIRL == 0      14.3544     10.3083      1.393      0.805
## UCIRL - LML == 0     -2.1290      9.7891     -0.217      1.000
## UIRL - LML == 0       1.9440     11.4720      0.169      1.000
## UML - LML == 0        1.4045     10.1535      0.138      1.000
## UIRL - UCIRL == 0     4.0729     11.1507      0.365      1.000
## UML - UCIRL == 0      3.5334      9.7891      0.361      1.000
## UML - UIRL == 0      -0.5395     11.4720     -0.047      1.000
## (Adjusted p values reported -- single-step method)

```