Lab Enrichment

PAZ

26 septembre 2017

Extraction error correlation - Alteck Soils

```
##
##  Pearson's product-moment correlation
##
## data:  c and sh
## t = 0.29581, df = 8, p-value = 0.7749
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.5624456  0.6885484
## sample estimates:
##       cor
## 0.1040159
```

Difference between error means - Water

Two tailed, if P < 0.05, we reject the null hypothesis that u1 = u2.

Results show that we cannot reject H_o (i.e., that means are equal, thus no sig. difference exists between means and the two populations distributions do not differ.

```
## [1] -0.05033333
```

```
## [1] 0.2173
```

```
##
##  Wilcoxon rank sum test
##
## data:  mQ and envW
## W = 5, p-value = 0.1714
## alternative hypothesis: true location shift is not equal to 0
```

Difference between error means - Soils

Paddy vs Rouff

```
## [1] -0.1447
```

```
## [1] 0.8648212
```

```
##
##  Wilcoxon signed rank test
##
## data:  paddy and rouff
## V = 1, p-value = 0.003906
## alternative hypothesis: true location shift is not equal to 0
```

Result: Paddy and Rouff are significantly different.

Paddy vs Alteck

```
## [1] 0.7649
```

```
##
##  Wilcoxon signed rank test
##
## data:  paddy and alteck
## V = 6, p-value = 0.02734
## alternative hypothesis: true location shift is not equal to 0
```

Result: Paddy and Alteck are significantly different.

Rouff vs Alteck

```
##
##  Wilcoxon signed rank test
##
## data:  rouff and alteck
## V = 47, p-value = 0.04883
## alternative hypothesis: true location shift is not equal to 0
```

Result: Rouffach and Alteck are significantly different.

Propagated error

Propagated error accounts for 1 SD of initial product and 1 SD from the method

```
## [1] 1.6
```

All data

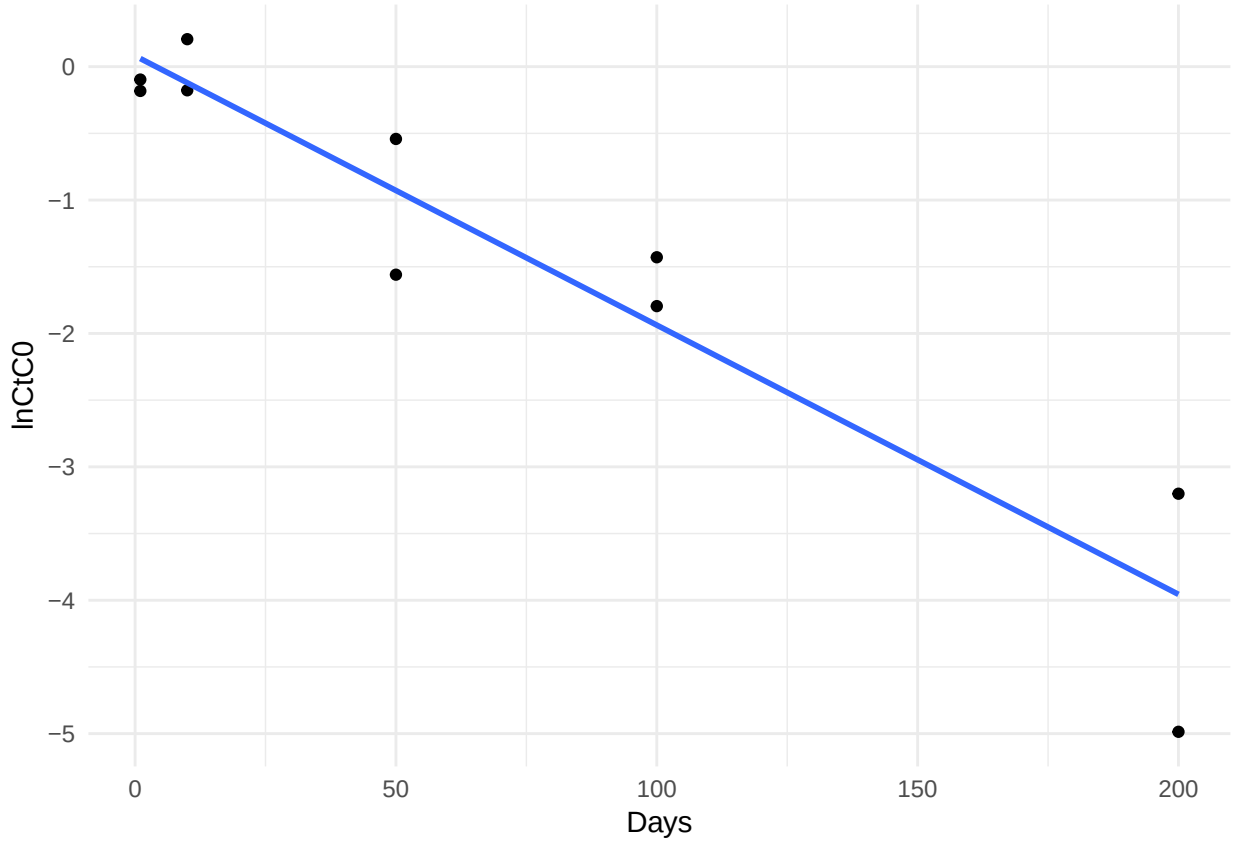
Degradation rate constant ($k_{1/2}$), DT50 and DT90

Single frist order rate model based on:

https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/degradation-kinetics-equations

```
##
## Call:
## lm(formula = lnCtC0 ~ Days, data = biotic)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.0303 -0.2216  0.0430  0.3714  0.7545
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.080965   0.256307   0.316     0.76
## Days        -0.020185   0.002499  -8.077 4.07e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5757 on 8 degrees of freedom
```

```
## Multiple R-squared:  0.8908, Adjusted R-squared:  0.8771
## F-statistic: 65.24 on 1 and 8 DF,  p-value: 4.074e-05
```

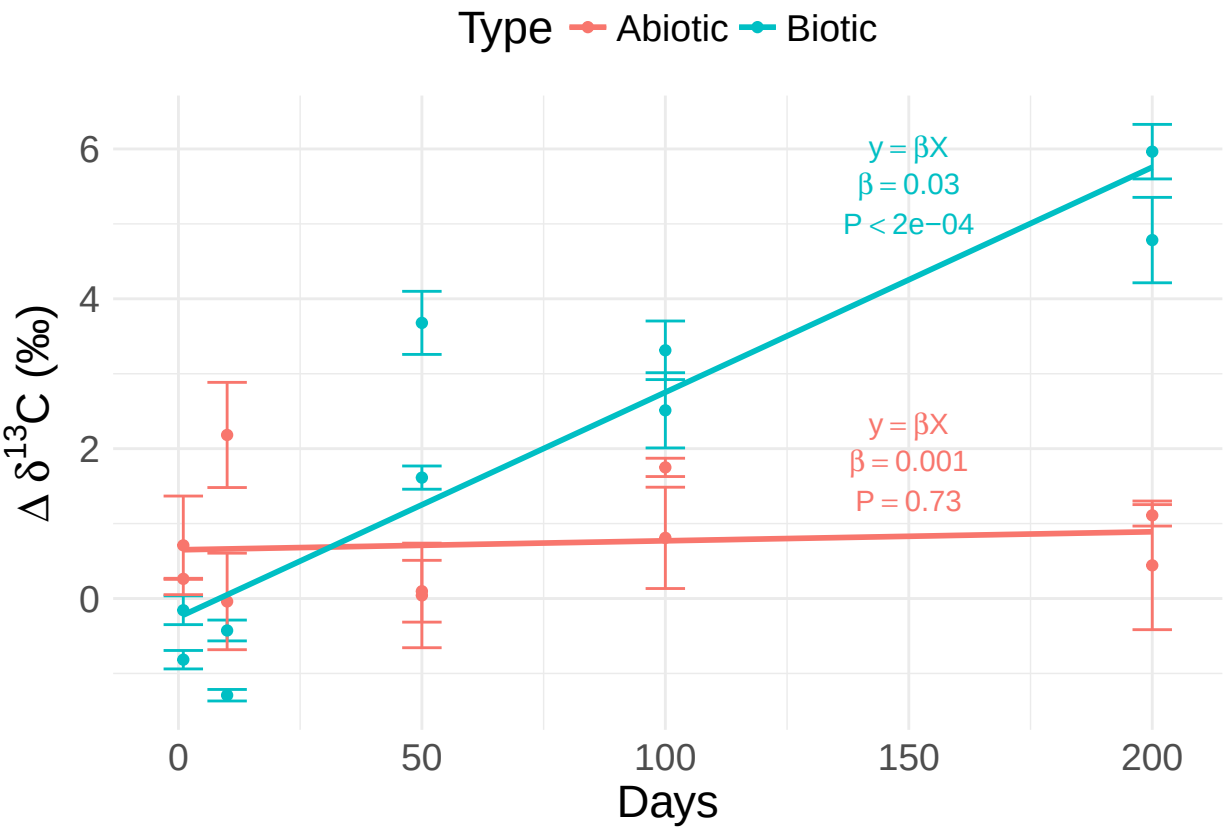


$\Delta\delta$ vs time

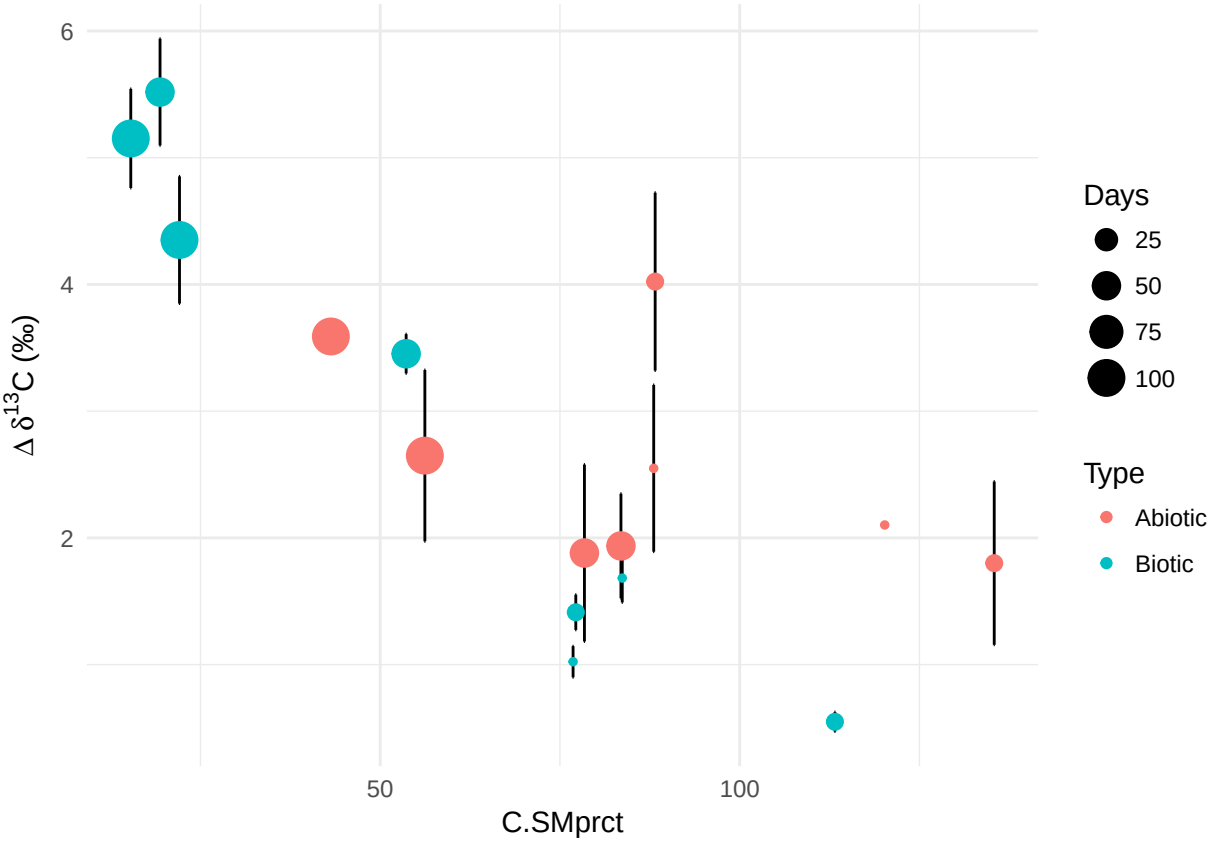
```
##
## Call:
## lm(formula = DD13m ~ Days, data = abiotic)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.7007 -0.5716 -0.1745  0.1793  1.5212
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.649872   0.351709   1.848    0.102
## Days        0.001205   0.003429   0.351    0.734
##
## Residual standard error: 0.79 on 8 degrees of freedom
## Multiple R-squared:  0.01521,    Adjusted R-squared:  -0.1079
## F-statistic: 0.1235 on 1 and 8 DF,  p-value: 0.7343
```

```
##
## Call:
## lm(formula = DD13m ~ Days, data = biotic)
```

```
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.33974 -0.56552 -0.08808  0.32419  2.42794
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.250842   0.491923  -0.510 0.623873
## Days         0.030033   0.004796   6.262 0.000243 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.105 on 8 degrees of freedom
## Multiple R-squared:  0.8306, Adjusted R-squared:  0.8094
## F-statistic: 39.21 on 1 and 8 DF,  p-value: 0.0002425
```



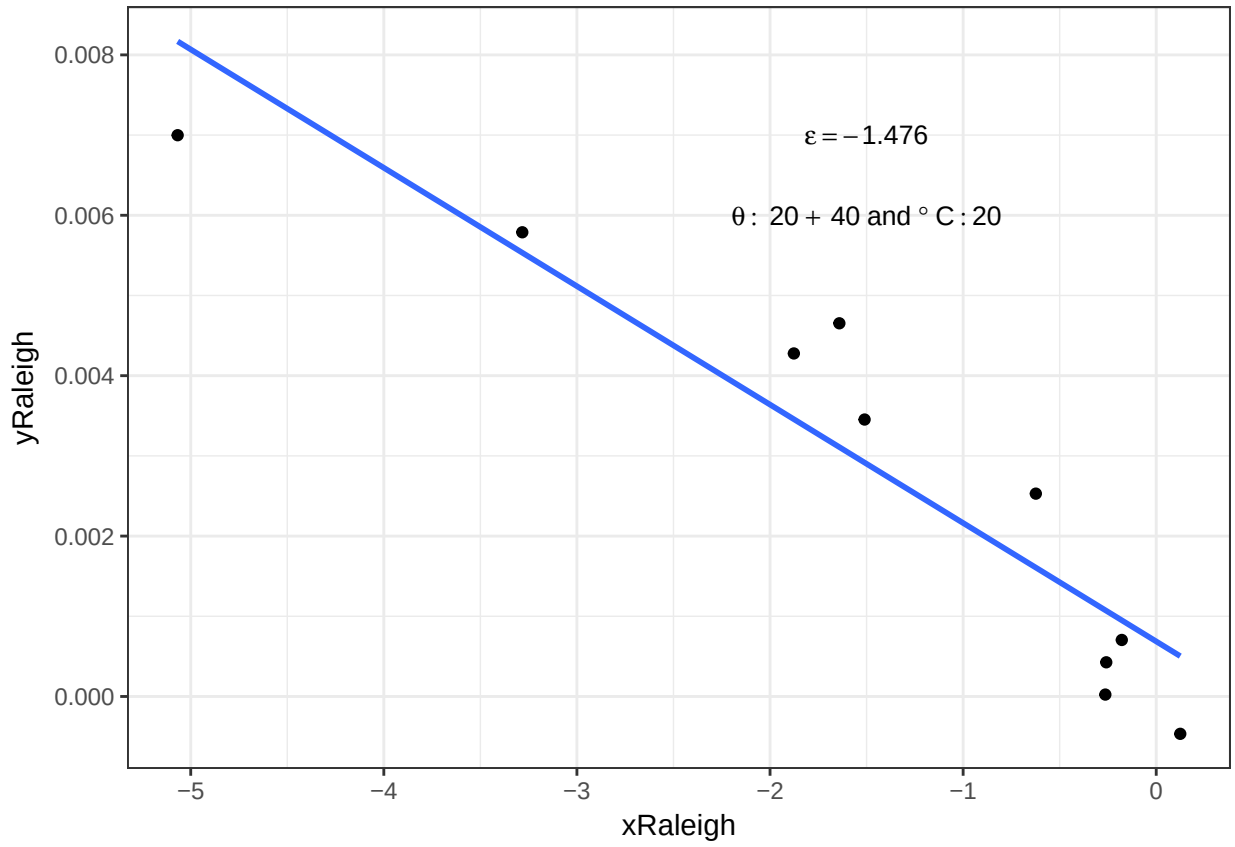
Delta vs Conc



Degradation experiments and ε_{lab} derivation

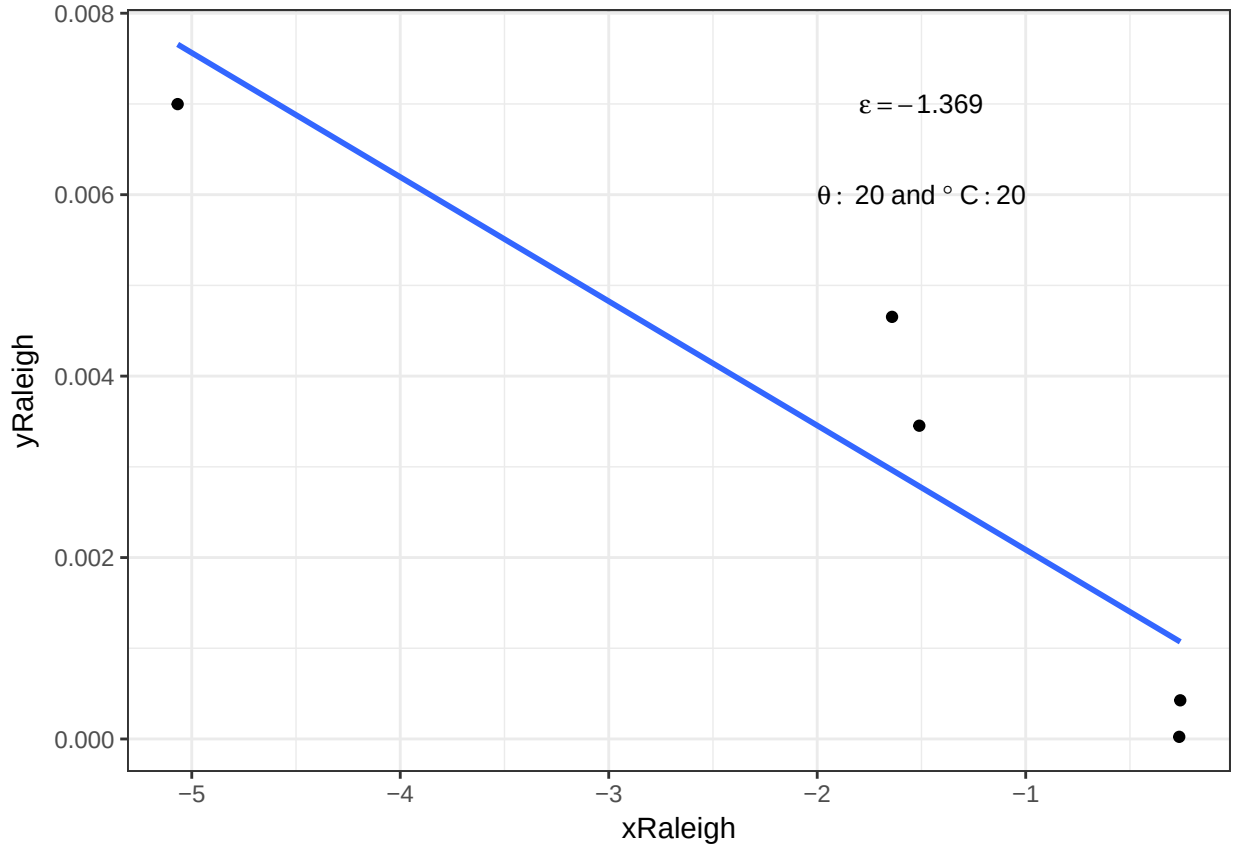
```
##
##  Pearson's product-moment correlation
##
## data:  bio$Delta and bio$C.SM
## t = -9.7288, df = 8, p-value = 1.042e-05
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.9908231 -0.8361424
## sample estimates:
##       cor
## -0.9602422
```

Rayleigh (20 °C, θ: 20 & 40)



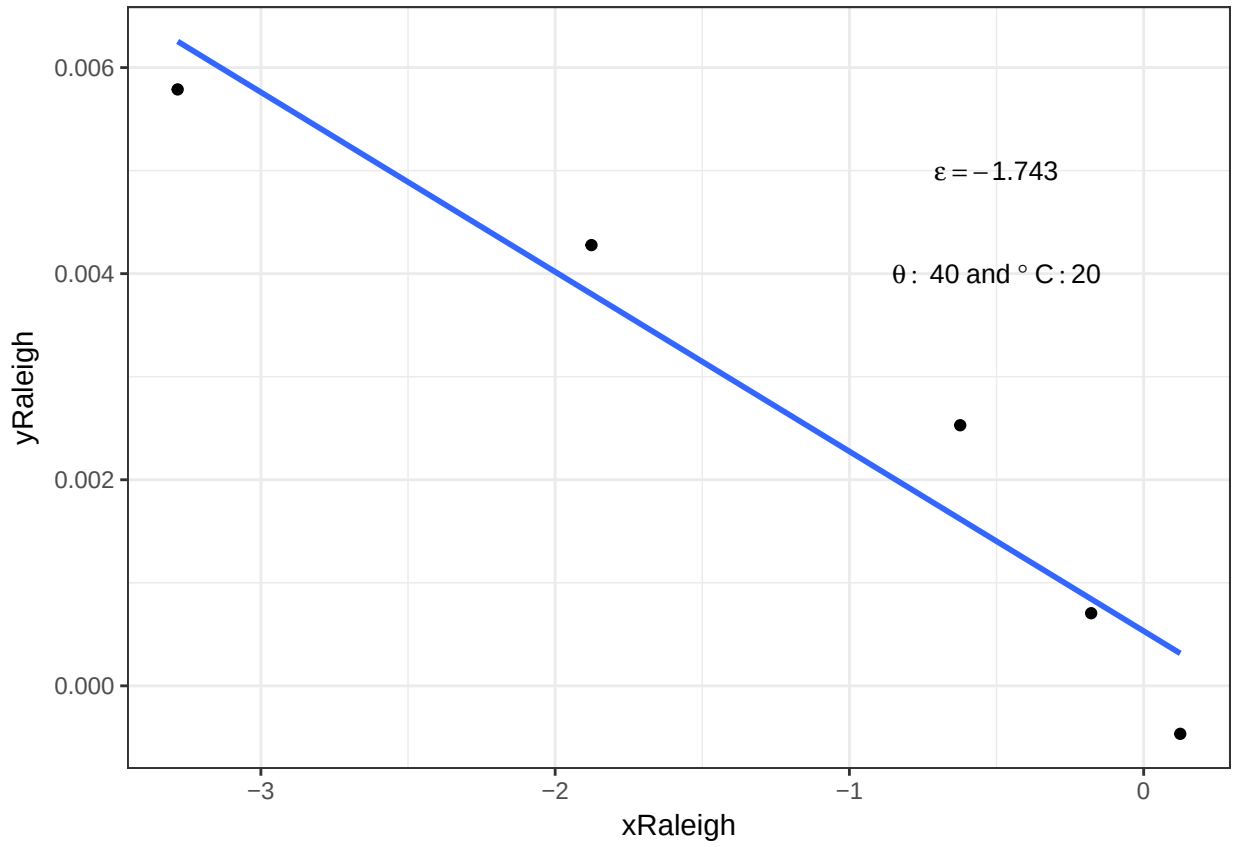

```
##
## Call:
## lm(formula = yRaleigh ~ xRaleigh, data = bio)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -1.170e-03 -8.870e-04  4.850e-06  7.493e-04  1.544e-03
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0006866  0.0004370   1.571    0.155
## xRaleigh    -0.0014763  0.0002048  -7.208 9.17e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.001009 on 8 degrees of freedom
## Multiple R-squared:  0.8666, Adjusted R-squared:  0.8499
## F-statistic: 51.96 on 1 and 8 DF,  p-value: 9.17e-05
```

Rayleigh (20 °C, θ: 20)




```
##
## Call:
## lm(formula = yRaleigh ~ xRaleigh, data = bio)
##
## Residuals:
##          1          2          3          4          5
## -0.0010541 -0.0006449  0.0016891  0.0006682 -0.0006584
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0007168  0.0008344   0.859   0.4535
## xRaleigh    -0.0013694  0.0003362  -4.073   0.0267 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.001324 on 3 degrees of freedom
## Multiple R-squared:  0.8469, Adjusted R-squared:  0.7958
## F-statistic: 16.59 on 1 and 3 DF,  p-value: 0.02671
```

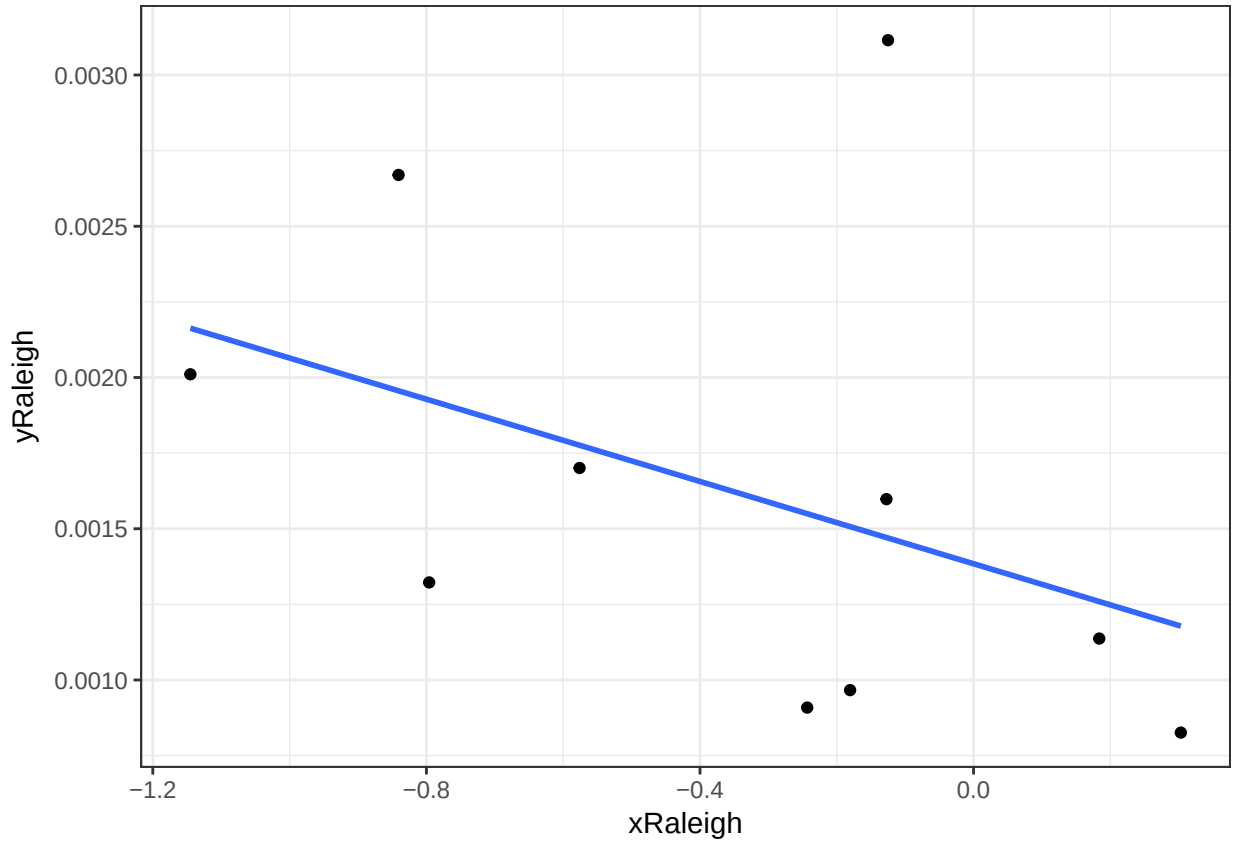
Rayleigh (20 °C, θ: 40)




```
##
## Call:
## lm(formula = yRaleigh ~ xRaleigh, data = bio)
##
## Residuals:
##          6          7          8          9         10
## -0.0001379 -0.0007807  0.0009105  0.0004742 -0.0004661
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0005319  0.0004854   1.096  0.35325
## xRaleigh    -0.0017430  0.0002827  -6.165  0.00859 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0007958 on 3 degrees of freedom
## Multiple R-squared:  0.9268, Adjusted R-squared:  0.9024
## F-statistic:    38 on 1 and 3 DF,  p-value: 0.008592
```

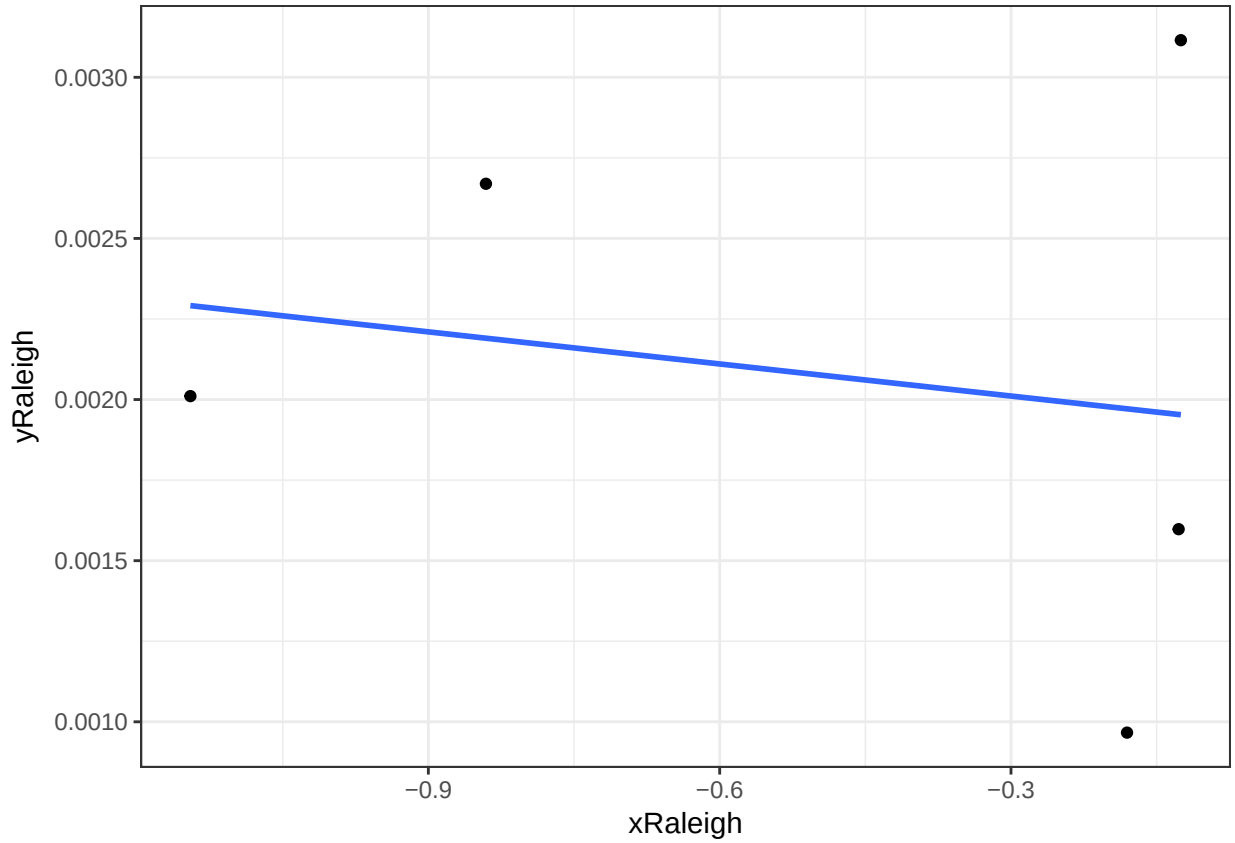
Abiotic data

Abiotic - Rayleigh (20 °C, θ: 20 & 40)



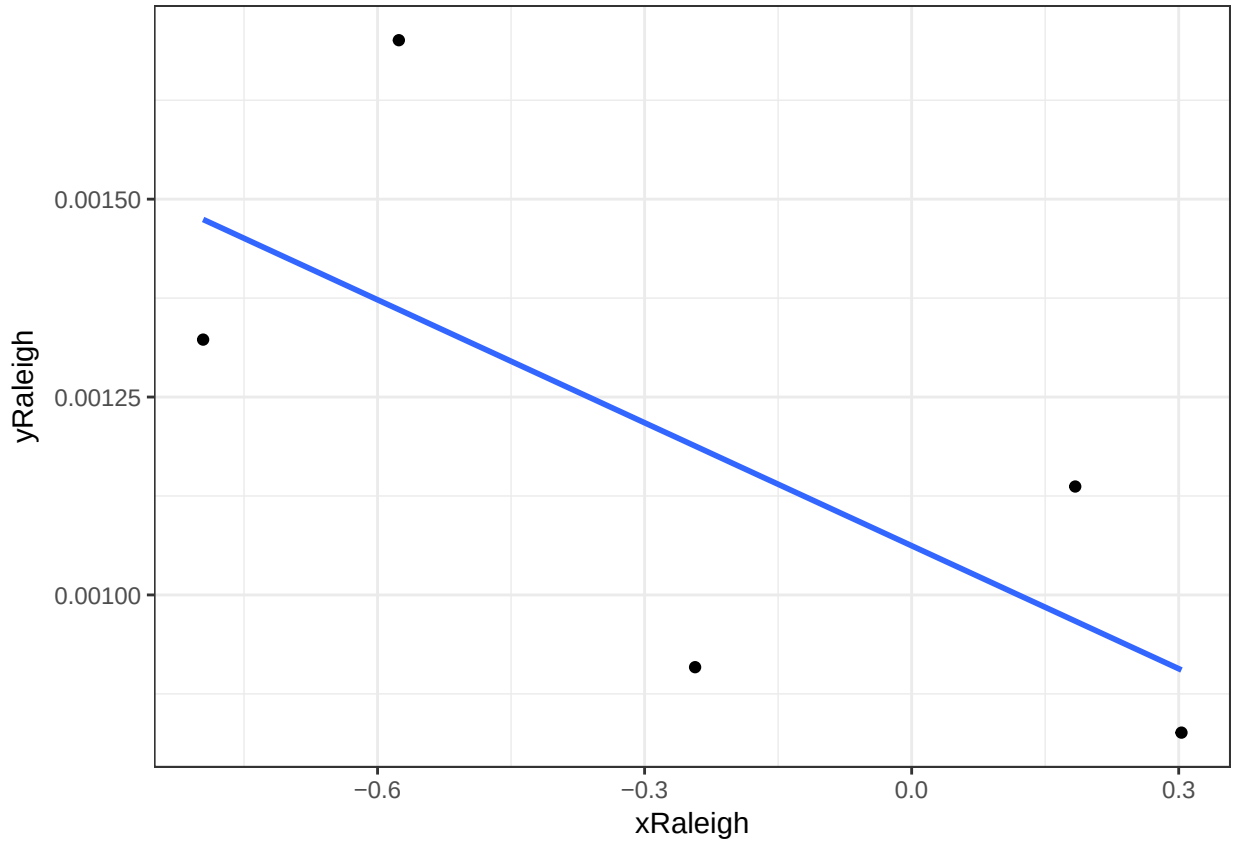

```
##
## Call:
## lm(formula = yRaleigh ~ xRaleigh, data = abiotic)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -0.0006410 -0.0004934 -0.0001373  0.0000764  0.0016458
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0013842  0.0003024   4.577  0.00181 **
## xRaleigh    -0.0006801  0.0005319  -1.279  0.23689
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0007474 on 8 degrees of freedom
## Multiple R-squared:  0.1697, Adjusted R-squared:  0.06588
## F-statistic: 1.635 on 1 and 8 DF,  p-value: 0.2369
```

Abiotic - Rayleigh (20 °C, θ: 20)




```
##
## Call:
## lm(formula = yRaleigh ~ xRaleigh, data = abiotic)
##
## Residuals:
##         21         22         23         24         25
## -0.0003559  0.0011623 -0.0010048  0.0004792 -0.0002808
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0019114  0.0006522   2.931    0.061 .
## xRaleigh    -0.0003319  0.0010106  -0.328    0.764
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0009653 on 3 degrees of freedom
## Multiple R-squared:  0.03471,    Adjusted R-squared:  -0.2871
## F-statistic: 0.1079 on 1 and 3 DF,  p-value: 0.7642
```

Abiotic - Rayleigh (20 °C, θ: 40)




```
##
## Call:
## lm(formula = yRaleigh ~ xRaleigh, data = abiotic)
##
## Residuals:
##         26         27         28         29         30
##  1.700e-04 -7.913e-05 -2.794e-04  3.404e-04 -1.518e-04
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0010621  0.0001469   7.229  0.00546 **
## xRaleigh    -0.0005179  0.0003063  -1.691  0.18949
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0002899 on 3 degrees of freedom
## Multiple R-squared:  0.4879, Adjusted R-squared:  0.3172
## F-statistic: 2.858 on 1 and 3 DF,  p-value: 0.1895
```