Calcite Analysis

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Setup data

```
coral <- read.csv("~/School/Fossil Coral/data/coral_3weighted.csv")

#omit data with no response
coral <- coral[!is.na(coral$U238),]


#select three largest species
genus_trim <- c("Acropora", "Porites")
#remove coral with age > 10
coral <- coral[which(coral$Genus %in% genus_trim),]  %>% dplyr::filter(Age < 10)

#clean up a nice dataframe
coral.df <- coral %>% mutate(Temperature = Temp,
                             Calcite = ifelse(is.na(Calcite),"N/A",ifelse(Calcite>1,"Calcite>1","Calcit
  select(U238,pH,TAlk,Salinity,Temperature,OmegaA,TCO2,Calcite) %>%
  data.frame()

coral.df$U238 <- coral.df$U238 * 0.421
nrow(coral.df)
```

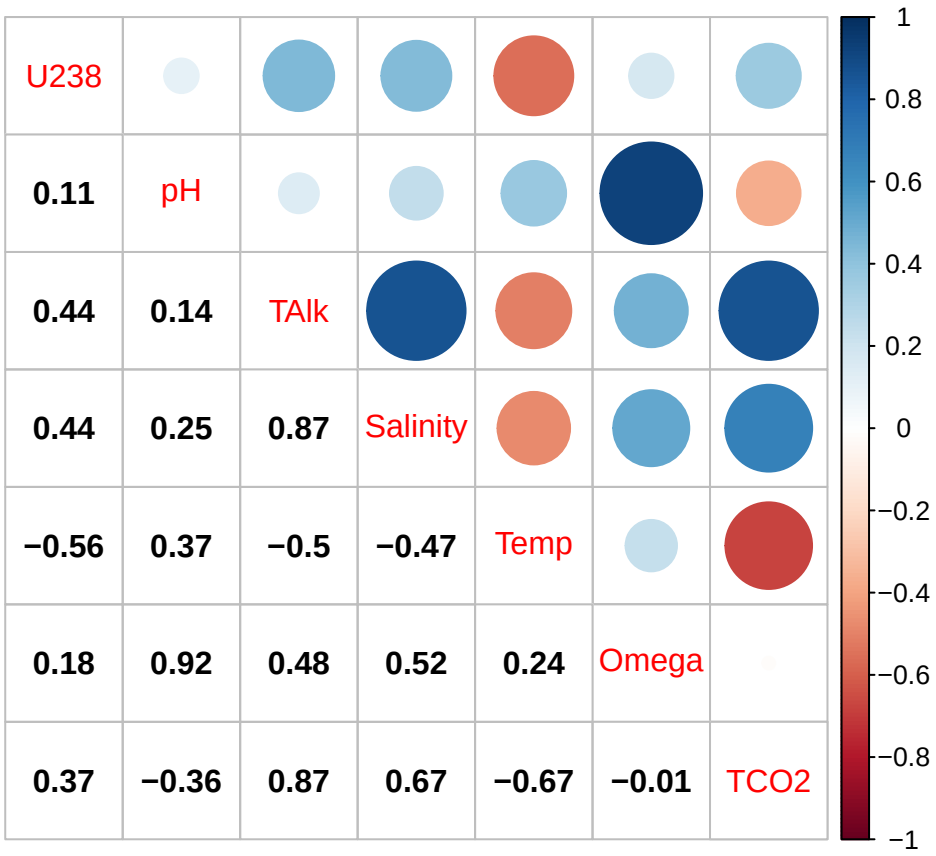
```
## [1] 737
```

```
library(corrplot)
```

```
## Warning: package 'corrplot' was built under R version 3.6.3
```

```
## corrplot 0.84 loaded
```

```
coral.corr <- coral.df %>% rename( Temp = Temperature, Omega = OmegaA) %>% select(-Calcite)
corrplot.mixed(cor(coral.corr),lower.col="black")
```




```
f1 <- ggplot(coral.df, aes(pH,U238))+
  geom_point()+
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)


f2 <- ggplot(coral.df, aes(Temperature,U238))+
  geom_point()+
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)


f3 <- ggplot(coral.df, aes(Salinity,U238))+
  geom_point()+
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)


f4 <- ggplot(coral.df, aes(OmegaA,U238))+
  geom_point()+
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)


f5 <- ggplot(coral.df, aes(TCO2,U238))+
  geom_point()+
```

```
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)


f6 <- ggplot(coral.df, aes(TAlk,U238))+
  geom_point()+
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)

grid.arrange(f1,f2,f3,f4,f5,f6,ncol=2)
```

```
## `geom_smooth()` using formula 'y ~ x'
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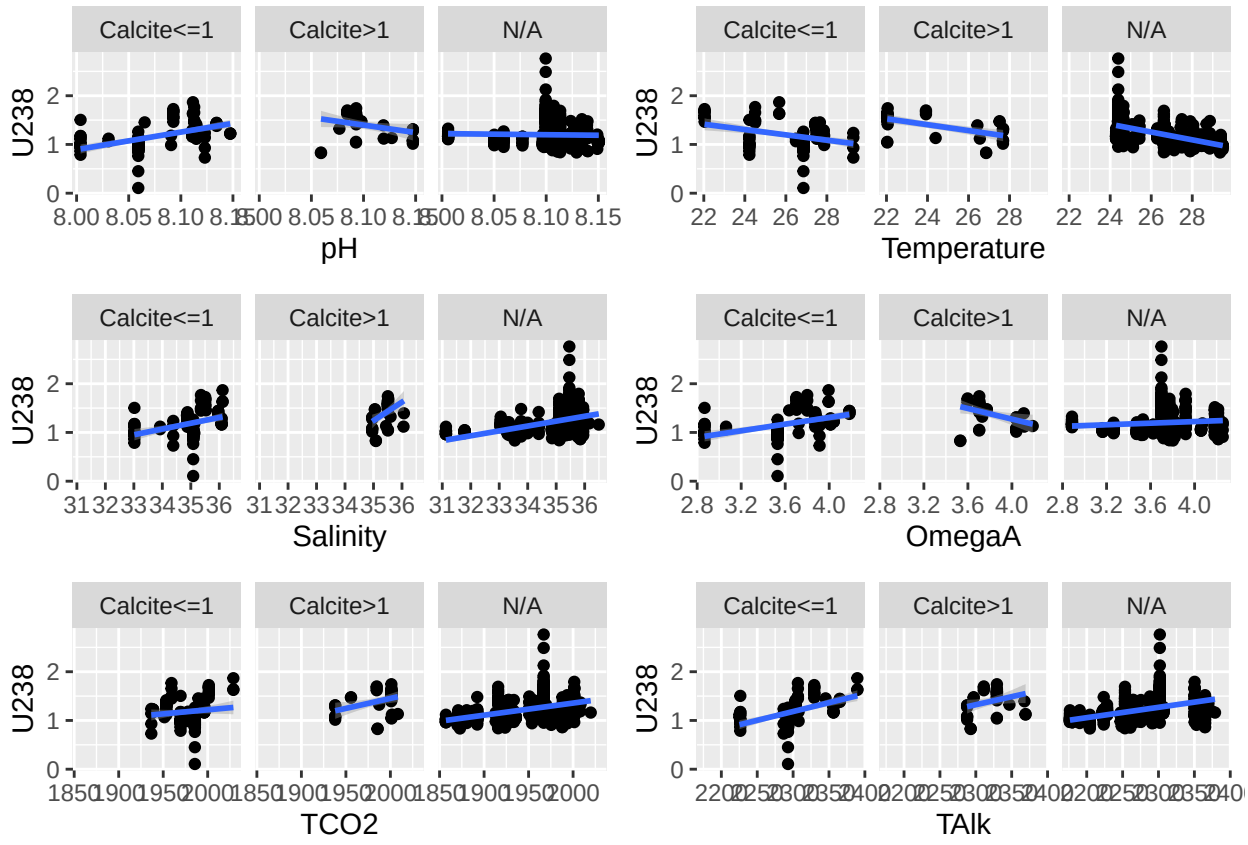

Figure A1 R^2

```
df1 <- coral.df[coral.df$Calcite=="Calcite<=1",]
df2 <- coral.df[coral.df$Calcite=="Calcite>1",]
```

```r
df3 <- coral.df[coral.df$Calcite=="N/A",]
nrow(df1)+nrow(df2)+nrow(df3)
```

```
## [1] 737
```

```r
#use adj.r.squared for adjusted instead of regular r squared

#temp
summary(lm(U238 ~ Temperature, data=df1))$r.squared
```

```
## [1] 0.1235968
```

```r
summary(lm(U238 ~ Temperature, data=df2))$r.squared
```

```
## [1] 0.3648011
```

```r
summary(lm(U238 ~ Temperature, data=df3))$r.squared
```

```
## [1] 0.348014
```

```r
#ph
summary(lm(U238 ~ pH, data=df1))$r.squared
```

```
## [1] 0.2704986
```

```r
summary(lm(U238 ~ pH, data=df2))$r.squared
```

```
## [1] 0.09206122
```

```r
summary(lm(U238 ~ pH, data=df3))$r.squared
```

```
## [1] 0.0007615722
```

```r
#salinity
summary(lm(U238 ~ Salinity, data=df1))$r.squared
```

```
## [1] 0.1288162
```

```r
summary(lm(U238 ~ Salinity, data=df2))$r.squared
```

```
## [1] 0.1871118
```

```r
summary(lm(U238 ~ Salinity, data=df3))$r.squared
```

```
## [1] 0.2080508
```

```r
#omega
summary(lm(U238 ~ OmegaA, data=df1))$r.squared
```

```
## [1] 0.1948816
```

```r
summary(lm(U238 ~ OmegaA, data=df2))$r.squared
```

```
## [1] 0.151737
```

```r
summary(lm(U238 ~ OmegaA, data=df3))$r.squared
```

```
## [1] 0.008188487
```

```r
#tco2
summary(lm(U238 ~ TCO2, data=df1))$r.squared
```

```
## [1] 0.01462431
```

```r
summary(lm(U238 ~ TCO2, data=df2))$r.squared
```

```
## [1] 0.1681431
```

```r
summary(lm(U238 ~ TCO2, data=df3))$r.squared
```

```
## [1] 0.1877872
```

```r
#Talk
summary(lm(U238 ~ TAlk, data=df1))$r.squared
```

```
## [1] 0.2560769
```

```r
summary(lm(U238 ~ TAlk, data=df2))$r.squared
```

```
## [1] 0.09128323
```

```r
summary(lm(U238 ~ TAlk, data=df3))$r.squared
```

```
## [1] 0.2012335
```