Calcite Analysis

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Setup data

```r
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
```

```r
library(corrplot)
```

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

```
## corrplot 0.84 loaded
```

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

U238	pH	TAlk	Salinity	Temp	Omega	TCO2
U238						
0.11	pH					
0.44	0.14	TAlk				
0.44	0.25	0.87	Salinity			
−0.56	0.37	−0.5	−0.47	Temp		
0.18	0.92	0.48	0.52	0.24	Omega	
0.37	−0.36	0.87	0.67	−0.67	−0.01	TCO2
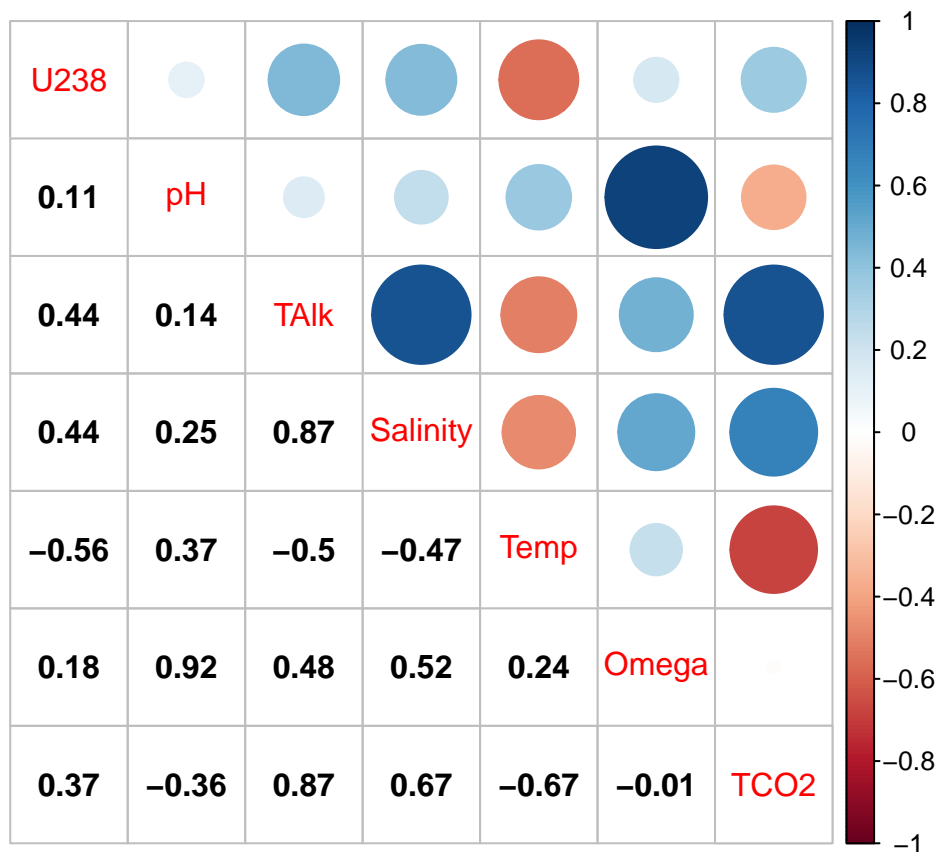
```r
f1 <- ggplot(coral.df, aes(pH,U238))+
  geom_point()+
  geom_smooth(method="lm")+
  facet_wrap(~Calcite)


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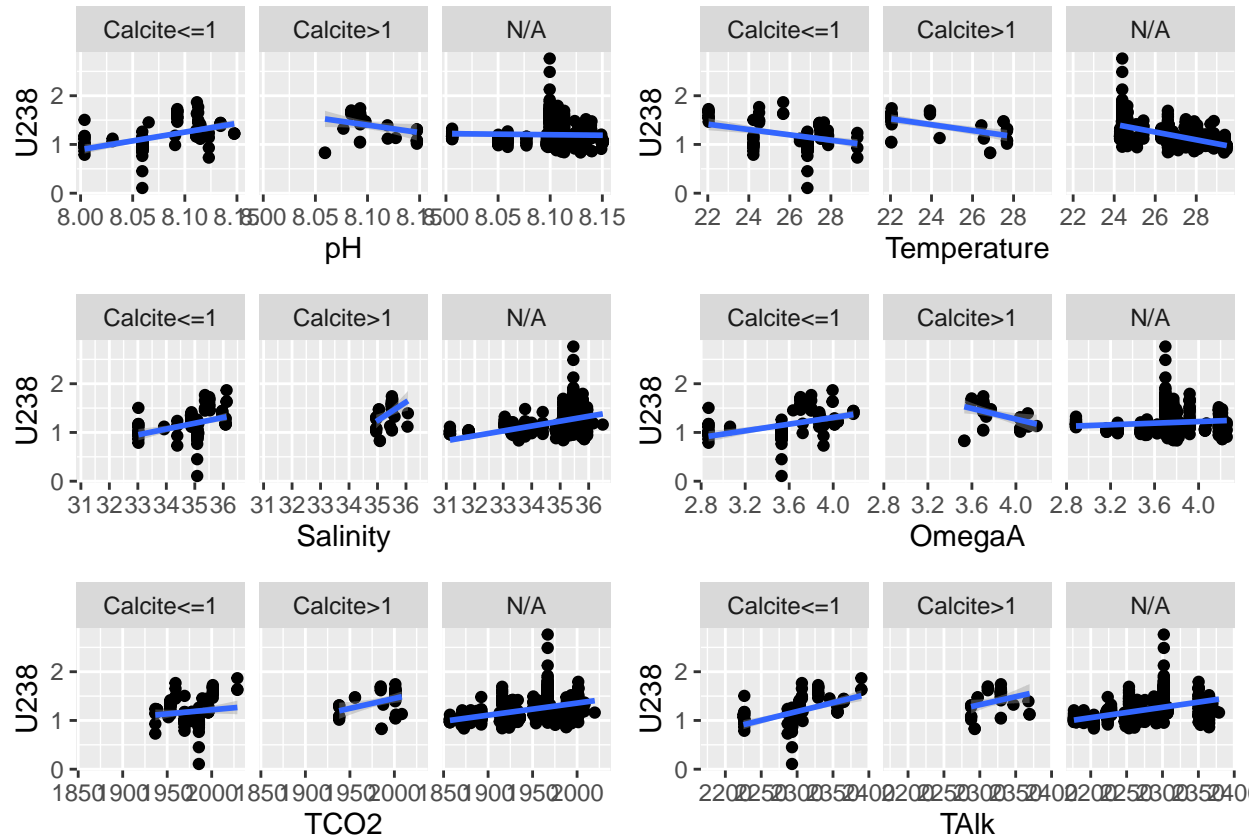

Figure A1 R values

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

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

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

```
#temp
cor(df1$U238,df1$Temperature)
```

```
## [1] -0.3515634
```

```
cor(df2$U238,df2$Temperature)
```

```
## [1] -0.6039877
```

```
cor(df3$U238,df3$Temperature)
```

```
## [1] -0.5899271
```

```
#ph
cor(df1$U238,df1$pH)
```

```
## [1] 0.5200948
```

```
cor(df2$U238,df2$pH)
```

```
## [1] -0.3034159
```

```
cor(df3$U238,df3$pH)
```

```
## [1] -0.0275966
```

```
#salinity
cor(df1$U238,df1$Salinity)
```

```
## [1] 0.3589097
```

```
cor(df2$U238,df2$Salinity)
```

```
## [1] 0.4325643
```

```
cor(df3$U238,df3$Salinity)
```

```
## [1] 0.4561259
```

```r
#omega
cor(df1$U238,df1$OmegaA)
```

```
## [1] 0.441454
```

```r
cor(df2$U238,df2$OmegaA)
```

```
## [1] -0.3895343
```

```r
cor(df3$U238,df3$OmegaA)
```

```
## [1] 0.09049026
```

```r
#tco2
cor(df1$U238,df1$TCO2)
```

```
## [1] 0.120931
```

```r
cor(df2$U238,df2$TCO2)
```

```
## [1] 0.4100526
```

```r
cor(df3$U238,df3$TCO2)
```

```
## [1] 0.4333442
```

```r
#Talk
cor(df1$U238,df1$TAlk)
```

```
## [1] 0.5060404
```

```r
cor(df2$U238,df2$TAlk)
```

```
## [1] 0.3021311
```

```r
cor(df3$U238,df3$TAlk)
```

```
## [1] 0.4485906
```