VOLUME, BIOMASS and ESD FUNCTIONS

This version uses the aloricate ciliate equation from Menden\_Deuer & Lessard 2000 (MDL).

Need to do another one with the Putt & Stoecker 1989 ratio.

Might also try with the MDL protist plankton equation. Need to separate diatoms by size and do two equations according to MDL.

Here I used the equation for diatoms > 3000 µm^3, since the first dataset I'm working with is the 100x samples

**BIOMASS**

biomass\_func <- function(Group, volume) {

biomass = 0

if(grepl("ciliate", Group, ignore.case = TRUE)){

biomass = .23 \* volume^.984

}

if(grepl("tintinnid", Group, ignore.case = TRUE)){

biomass = .216 \* volume^.939

}

if(grepl("chlorophyte", Group, ignore.case = TRUE)){

biomass = .216 \* volume^.939

}

if(grepl("diatom", Group, ignore.case = TRUE)){

biomass = .117 \* volume^.881

}

if(grepl("dinoflagellate", Group, ignore.case = TRUE)){

biomass = .760 \* volume^.819

}

if(grepl("flagellate", Group, ignore.case = TRUE)){

biomass = .216 \* volume^.939

}

if(grepl("ochrophyte", Group, ignore.case = TRUE)){

biomass = .216 \* volume^.939

}

if(grepl("unidentified", Group, ignore.case = TRUE)){

biomass = .216 \* volume^.939

}

if(grepl("cyanobacteria", Group, ignore.case = TRUE)){

biomass = .181 \* volume

}

if(biomass == 0){

return(NA)

} else{

return(biomass)

}

}

**VOLUME**

vol\_func <- function(diameter, height, width, shape, counts) {

pi= 3.1415

volume = 0

if(grepl("cone1", shape, ignore.case = TRUE)){

volume = (pi/12) \* diameter^2 \* height

}

if(grepl("cones2", shape, ignore.case = TRUE)){

volume = 2\*(pi/12) \* diameter^2 \* height

}

if(grepl("sph", shape, ignore.case = TRUE)){

volume = (pi/6) \* diameter^3

}

if(grepl("prosph", shape, ignore.case = TRUE)){

volume = (pi/6) \* diameter^2 \* height

}

if(grepl("cyl", shape, ignore.case = TRUE)){

volume = (pi/4) \* diameter^2 \* height

}

if(grepl("ellips", shape, ignore.case = TRUE)){

volume = (pi/6) \* diameter \* height \* width

}

if(grepl("recbox", shape, ignore.case = TRUE)){

volume = diameter \* height \* width

}

if(grepl("prisell", shape, ignore.case = TRUE)){

volume = (pi/4) \* diameter \* height \* width

}

if(grepl("prispar", shape, ignore.case = TRUE)){

volume = 0.5 \* diameter \* height \* width

}

if(volume == 0){

return(NA)

} else{

return(volume \* counts)

}

}

**EQUIVALENT SPHERICAL DIAMETER**

esd\_func <- function(vol\_per\_org\_um3){

pi=3.1415

esd = 2\*(((0.75/pi\*vol\_per\_org\_um3)^(1/3)))

return(esd)

}