HW Week 2

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getwd()

## [1] "C:/Users/mille/Desktop/Coursework/Spring 2022 Semester/Env Data Mgmt"

library(ggplot2)  
library(gridExtra)

## Warning: package 'gridExtra' was built under R version 4.1.2

library(reshape2)

## Warning: package 'reshape2' was built under R version 4.1.2

library(tidyr)

## Warning: package 'tidyr' was built under R version 4.1.2

##   
## Attaching package: 'tidyr'

## The following object is masked from 'package:reshape2':  
##   
## smiths

library(chron)

## Warning: package 'chron' was built under R version 4.1.2

library(dplyr)

## Warning: package 'dplyr' was built under R version 4.1.2

##   
## Attaching package: 'dplyr'

## The following object is masked from 'package:gridExtra':  
##   
## combine

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(zoo)

## Warning: package 'zoo' was built under R version 4.1.2

##   
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':  
##   
## as.Date, as.Date.numeric

library(ggpubr)

## Warning: package 'ggpubr' was built under R version 4.1.2

library(readxl)

## Warning: package 'readxl' was built under R version 4.1.2

library(streamMetabolizer)

## USGS Active Research Package:  
## https://owi.usgs.gov/R/packages.html#research

## This package was developed for research purposes. We used it for our  
## own applications and welcome flexible, resilient users who can help us  
## test and improve the package. Please give us feedback at  
## https://github.com/USGS-R/streamMetabolizer/issues/new.

setwd("C:/Users/mille/Desktop/2021 Gibson Jack Data/Metabolism Data")  
UP <- read\_excel("UP\_1s\_May\_August2021-10min.xlsx")  
DPB <- read\_excel("DPB\_1s\_May\_October.xlsx", na ="NA")

# Checking Columns to see if they look good  
str(UP) # look at structure

## tibble [11,421 x 7] (S3: tbl\_df/tbl/data.frame)  
## $ MST\_time : chr [1:11421] "2021-05-26 14:09:00" "2021-05-26 14:19:00" "2021-05-26 14:29:00" "2021-05-26 14:39:00" ...  
## $ DO.obs : num [1:11421] 8.12 8.99 9.31 9.31 9.31 ...  
## $ temp.water : num [1:11421] 15.49 10.46 9.72 9.71 9.82 ...  
## $ Lux : num [1:11421] 34445 24800 17222 15156 14467 ...  
## $ temp.air : num [1:11421] 15.7 13.5 12.3 11.9 12.1 ...  
## $ depth : num [1:11421] 0.16 0.16 0.16 0.16 0.16 ...  
## $ discharge\_cms: num [1:11421] 0.0375 0.0375 0.0375 0.0375 0.0375 ...

colnames(UP) # column names

## [1] "MST\_time" "DO.obs" "temp.water" "Lux"   
## [5] "temp.air" "depth" "discharge\_cms"

# converting LUX into PPFD and manipulating MST\_time into solar time  
UP$PPFD <- (UP$Lux/683)/2.35  
  
## Convert date and time from MST (denoted by Etc/GMT+6) to solar time  
posix.time.localtz <- as.POSIXct(UP$MST\_time, format="%Y-%m-%d %H:%M", tz='Etc/GMT+6')  
  
  
lubridate::tz(posix.time.localtz)

## [1] "Etc/GMT+6"

#posix.time.localtz  
  
solar.time <- streamMetabolizer::calc\_solar\_time(posix.time.localtz, longitude=-112.437768)  
  
UP$solar.time <- solar.time  
  
# Same thing for DPB  
DPB$PPFD <- (DPB$Lux/683)/2.35  
  
posix.time.localtz <- as.POSIXct(DPB$MST\_time, format="%Y-%m-%d %H:%M", tz='Etc/GMT+6')  
  
lubridate::tz(posix.time.localtz)

## [1] "Etc/GMT+6"

solar.time <- streamMetabolizer::calc\_solar\_time(posix.time.localtz, longitude=-112.437768)  
  
DPB$solar.time <- solar.time

#3

#running a loop to load files  
data\_folder <- "C:/Users/mille/Desktop/2021 Gibson Jack Data/Metabolism Data/"  
  
Reach\_files <- list.files(data\_folder, pattern = ".xlsx")  
  
#for(i in 1:length(Reach\_files)) {  
  
# UP2 <- read\_excel(paste0(data\_folder, Reach\_files[i]), sheet = "UP\_1s\_May\_August2021-10min.xlsx", col\_names = TRUE, na = "NA")  
# DPB2 <- read\_excel(paste0(data\_folder, Reach\_files[i]), sheet = "DPB\_1s\_May\_October.xlsx", col\_names = TRUE, na = "NA")  
  
# if(all(colnames(UP) == colnames(DPB)) != TRUE) {  
# print(Reach\_files[i])  
# print("Error in colnames for DPB") }  
#}  
  
##Talk to Derek about why this is not working. Reach\_files shows that these files can be seen but when I run my loop it says the sheets cant be found.

#4

UP\_filter <- UP %>% filter(DO.obs > 8.5)  
#Filtering the data to only show times when light was greater than 0 AKA daytime hours

#5

ggplot(UP\_filter, aes(x= solar.time, y= DO.obs)) + geom\_point() + theme\_classic() +  
 xlab("time") + ylab("g O2/m^2/d") + ggtitle("DO Observations greater than 8.5 g O2/m^2/d") + theme(plot.title = element\_text(hjust = 0.5))

