SI Graphs Water Research

PAZ

23 novembre 2017

Purpose

This produces a Hyetograph (rainfall and discharge data) based on 2 min intrevals.

Input files:

- **groupAlteck2016_R** (Contains discharge and rainfall @ 2 min)

Output files:

- **nothing for now**

Libraries

```
# Hyetograph
library(ggplot2)

# getwd()
# setwd("D:/Documents/these_pablo/Alteckendorf2016/HydrologicalMonitoring")
```

Data

```
# Discharge and 2 min rainfall
hydro = read.csv2("Data/groupAlteck2016_R.csv")
hydro$Date = as.POSIXct(strptime(hydro$DateCheck.S,
                                 "%d/%m/%Y %H:%M", tz="EST") )

names(hydro)
```

```
##  [1] "Date"          "DateCheck.S"   "DateCheck"     "Q.m3Hrs"
##  [5] "Qna"           "Qapprox"       "Qinterp"       "Q.HW1"
##  [9] "Q.HW2"         "DayMoYr"       "Vol2min"       "sampleQ"
## [13] "Type"          "Rain.mm"       "Rain12min.mm"  "SubWeeks"
## [17] "Weeks"         "WeekNo"        "Event"         "PercentChange"
## [21] "Change"        "Markers"       "TimeDiff"      "numNoEvent"
## [25] "noEventHrs"    "numNoRain"     "dryhrs"
```

```
qra <- hydro[, c("Date", "Q.HW1", "Rain.mm")]

# Catchment area
area <- 47*10**4 # [m2]
```

Conversions

Convert rainfall data $[mm]$ to the same units as discharge $[m^3/h]$

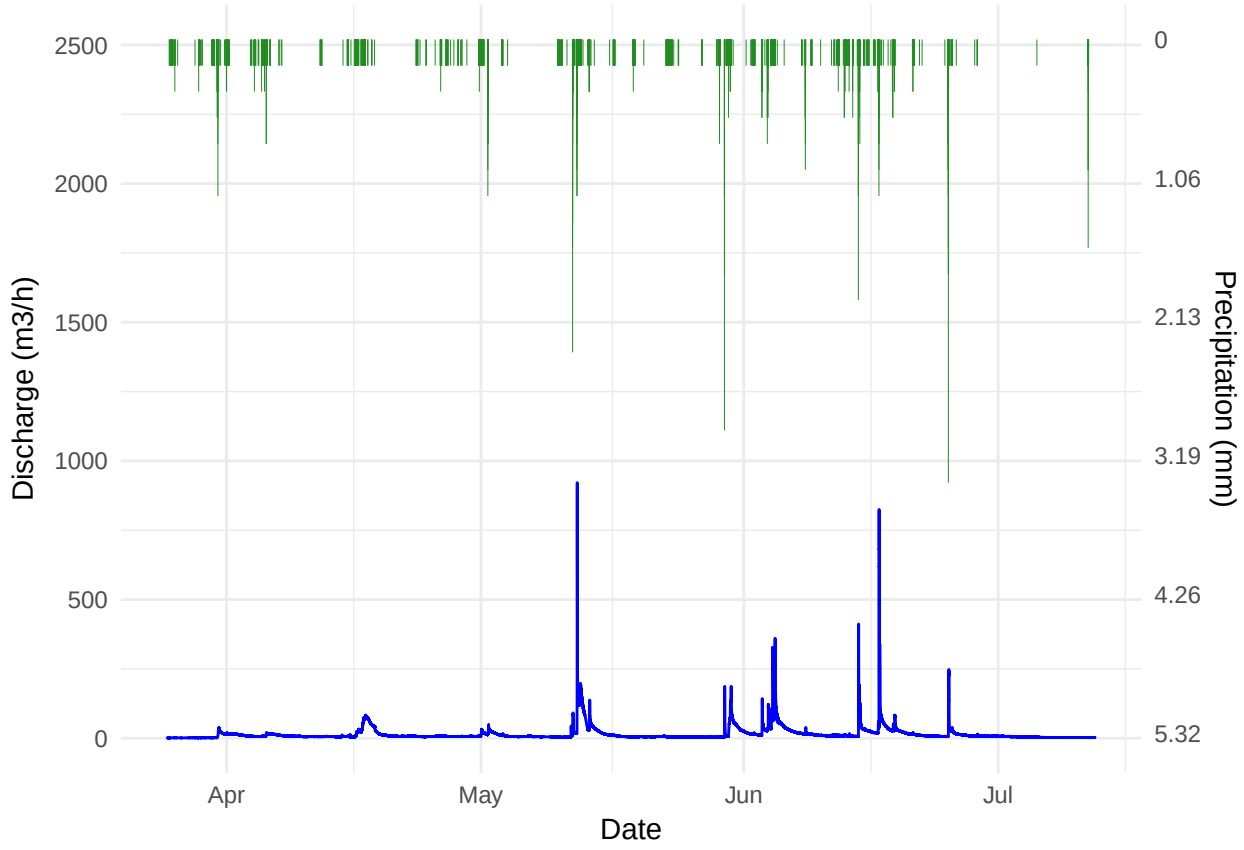
```r
qra$precip_m3 = qra$Rain.mm/10^3 * area

# Calculate the range needed to avoid having your hyetograph and hydrograph overlap
maxRange <- 1*(max(qra$precip_m3) + max(qra$Q.HW1))

# Create a function to backtransform the axis labels for precipitation
precip_labels <- function(x) {round( ((x / area) * 10^3), digits = 2) } # X will be precip_m3 -> conver

# Plot the data
ggplot(data = qra,
       aes(x = Date)) +
  theme_minimal() +
  # Use geom_tile to create the inverted hyetograph. geom_tile has a bug that displays a warning messag
  geom_tile(aes(y = -1*(precip_m3/2-maxRange), # y = the center point of each bar, as geom_tile uses va
                height = precip_m3,
                width = 1
                ),
            fill = "gray50",
            color = "forestgreen") +
  # Plot your discharge data
  geom_line(aes(y = Q.HW1),
            color = "blue") +
  # Create a second axis with sec_axis() and format the labels to display the original precipitation un
  scale_y_continuous(name = "Discharge (m3/h)",
                     sec.axis = sec_axis(trans = ~-1*(.-maxRange), # Equivalent to: y2 = -1*(y1 - maxRa
                                         name = "Precipitation (mm)",
                                         labels = precip_labels)) # x here is = precip_cuft
```

```
## Warning: Ignoring unknown aesthetics: height, width
```


2500
2000
1500
1000
500
0
Discharge (m3/h)
0
1.06
2.13
3.19
4.26
5.32
Precipitation (mm)
Apr
May
Jun
Jul
Date