Lab 2 ATMS 748

Jack Tarricone

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Directions

- Acquire data with your program on data card
- Copy data table to your PC in CSV format (Loggernet:)
- Copy your CSV data to UNR Box
- Copy other lab teams' CSV data files from Box
- Write a program to read the data and make time series plots
- Turn in plot of timeseries of your HMP-155 temperature measurements and ensemble-averaged temperature measurements with standard deviation (error bars or patch)
- Turn in plot of timeseries of your HMP-155 relative humidity measurements and ensemble-averaged relative humidity measurements with standard deviation (error bars or patch)
- Turn in windrose plot of your wind measurements (wind speed and direction) • Turn in electronic copy of program

Read in CSV files

This doesn't include our group's data because it was collected the week after.

```
# read in csv and make room for colnames
g1 <-read.csv("/Users/jacktarricone/atms_748/data-code/lab2_data/csvs/lab2_g1.csv")
g2 <-read.csv("/Users/jacktarricone/atms_748/data-code/lab2_data/csvs/lab2_g2.csv")
g4 <-read.csv("/Users/jacktarricone/atms_748/data-code/lab2_data/csvs/lab2_g4.csv")
g5 <-read.csv("/Users/jacktarricone/atms_748/data-code/lab2_data/csvs/lab2_g5.csv")
```

Transform dates back into R dates

```
# read in csv and make room for colnames
g1$date_time <-ymd_hms(g1$date_time)
g2$date_time <-ymd_hms(g2$date_time)
g4$date_time <-ymd_hms(g4$date_time)
g5$date_time <-ymd_hms(g5$date_time)
```

```
# trim each df down so it has the same date_time range
g1_filt <-filter(g1, date_time >= ymd_hms("2022-01-25 17:45:00") & date_time <= ymd_hms("2022-02-01 15:4
g2_filt <-filter(g2, date_time >= ymd_hms("2022-01-25 17:45:00") & date_time <= ymd_hms("2022-02-01 15:4
g4_filt <-filter(g4, date_time >= ymd_hms("2022-01-25 17:45:00") & date_time <=ymd_hms("2022-02-01 15:45
g5_filt <-filter(g5, date_time >= ymd_hms("2022-01-25 17:45:00") & date_time <=ymd_hms("2022-02-01 15:45
```

RH

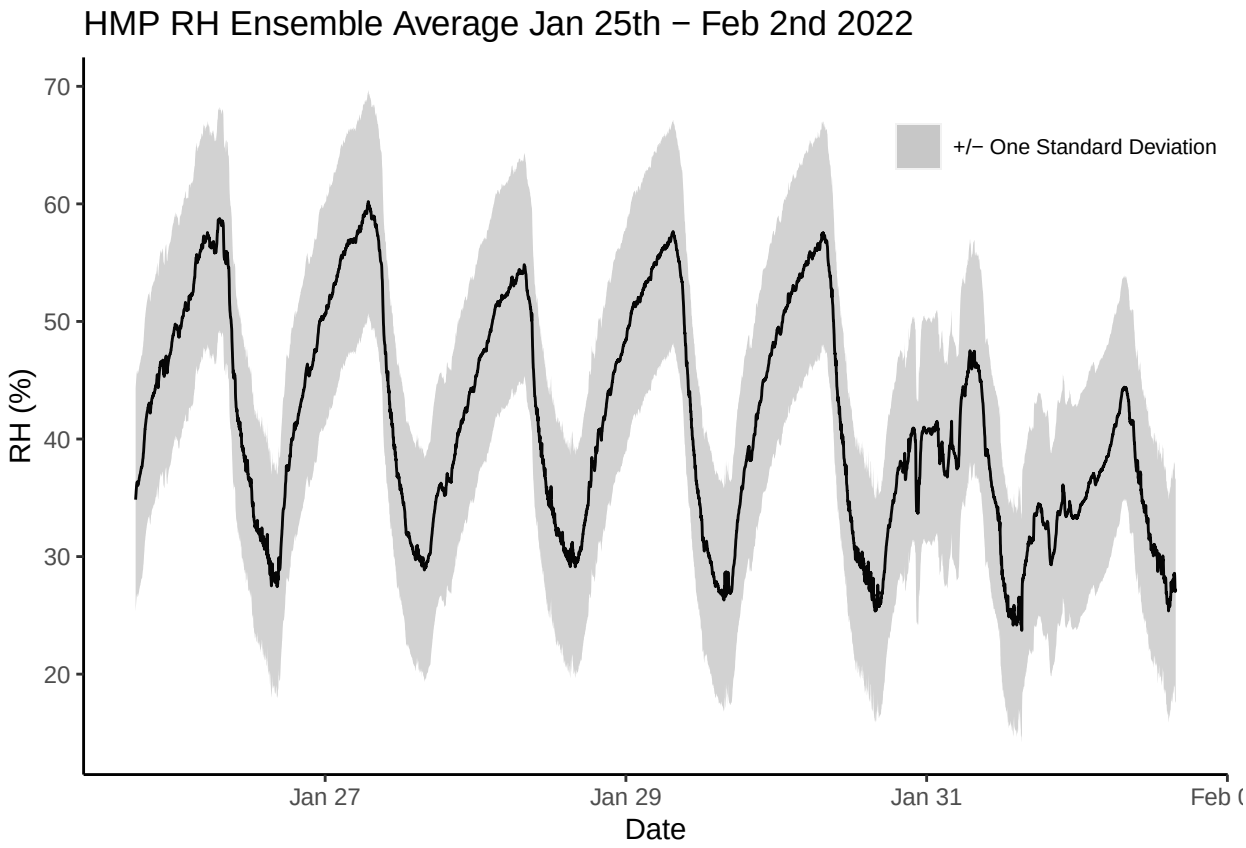
```
# create new df with RH for all 4 groups
rh_df <-cbind(g1_filt$RH, g2_filt$RH, g4_filt$RH, g5_filt$RH)
rh_df <-as.data.frame(rh_df)
date_time <-ymd_hms(g1_filt$date_time)
rh <-cbind(date_time, rh_df)
colnames(rh) <-c("date_time","g1_RH", "g2_RH","g4_RH","g5_RH")

# create mean col
rh$mean <-(rh$g1_RH+rh$g2_RH+rh$g4_RH+rh$g5_RH)/4

# create sd col
rh$sd <-sd(rh$mean)
```

Didn't include our data becasue it was from the week after.

```
#theme_set(theme_classic(12)) # set theme for plotting
ggplot(rh) +
  #geom_line(aes(x = date_time, y = g1_RH, col = "red")) +
  #geom_line(aes(x = date_time, y = g2_RH, col = "green")) +
  #geom_line(aes(x = date_time, y = g4_RH, col = "blue")) +
  #geom_line(aes(x = date_time, y = g5_RH, col = "goldenrod")) +
  geom_line(aes(x = date_time, y = mean), col = "black") +
  geom_ribbon(aes(x = date_time, ymin = mean-sd, ymax = mean+sd, fill = "+/- One Standard Deviation"), a
  scale_fill_manual("",values="grey12") +
  labs(title = "HMP RH Ensemble Average Jan 25th - Feb 2nd 2022") +
  ylab("RH (%)") +
  xlab("Date") +
    theme(axis.line = element_line(colour = "black"),
        panel.grid.major = element_blank(),
        panel.grid.minor = element_blank(),
        panel.border = element_blank(),
        panel.background = element_blank(),
        legend.position = c(.85,.9),
        legend.text = element_text(size = 8),
        legend.title = element_text(size = 9, face = "bold"),
        legend.margin = margin(t=0, unit='cm'),
        legend.key = element_rect(size = .2))
```



Air Temperature

Again, did not include our data because of the time difference.

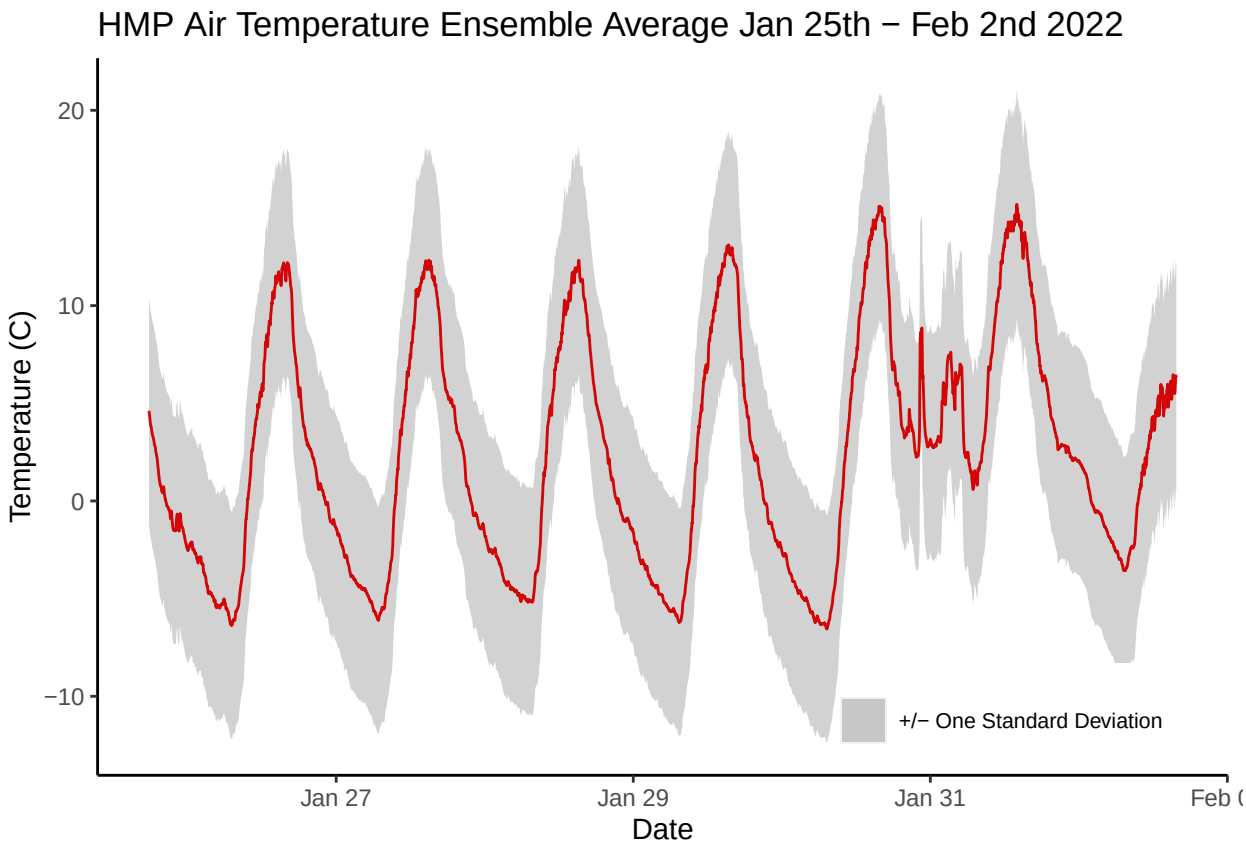
```
# create new df with air temp for all 4 groups
at_df <-cbind(g1_filt$AirTC_Avg, g2_filt$AirTC_Avg, g4_filt$AirTC_Avg, g5_filt$AirTC_Avg)
at_df <-as.data.frame(at_df)
date_time <-ymd_hms(g1_filt$date_time)
at <-cbind(date_time, at_df)
colnames(at) <-c("date_time","g1_at", "g2_at","g4_at","g5_at")

# create mean col
at$mean <-(at$g1_at+at$g2_at+at$g4_at+at$g5_at)/4

# create sd col
at$sd <-sd(at$mean)
```

```
ggplot(at) +
  geom_line(aes(x = date_time, y = mean), col = "red") +
  # geom_line(aes(x = g1_filt$date_time, y = g1_filt$AirTC_Avg, col = "red")) +
  # geom_line(aes(x = g2_filt$date_time, y = g2_filt$AirTC_Avg,col = "green")) +
  # geom_line(aes(x = g4_filt$date_time, y = g4_filt$AirTC_Avg,col = "blue")) +
```

```
# geom_line(aes(x = g5_filt$date_time, y = g5_filt$AirTC_Avg, col = "goldenrod")) +
geom_ribbon(aes(x = date_time, ymin = mean-sd, ymax = mean+sd, fill = "+/- One Standard Deviation"), a
scale_fill_manual("",values="grey12") +
labs(title = "HMP Air Temperature Ensemble Average Jan 25th - Feb 2nd 2022") +
ylab("Temperature (C)") +
xlab("Date") +
  theme(axis.line = element_line(colour = "black"),
      panel.grid.major = element_blank(),
      panel.grid.minor = element_blank(),
      panel.border = element_blank(),
      panel.background = element_blank(),
      legend.position = c(.8,.1),
      legend.text = element_text(size = 8),
      legend.title = element_text(size = 9, face = "bold"),
      legend.margin = margin(t=0, unit='cm'),
      legend.key = element_rect(size = .2))
```



Wind Rose

```
# read in our csv and make room for colnames
g3 <-read.csv("/Users/jacktarricone/atms_748/data-code/lab2_data/csvs/jack_eric.csv")
```

```
# format date
g3$date <-ymd_hms(g3$date_time)
```

```
# correct for magnetic north
g3$windDirection <-g3$windDirection -2
```

```
windRose(g3, ws = "windSpeed", wd = "windDirection", angle = 10, ws.int = .3,
         cols = c("black", "blue", "green", "yellow"), width = 1.5, auto.text = FALSE, paddle = FALSE)
```