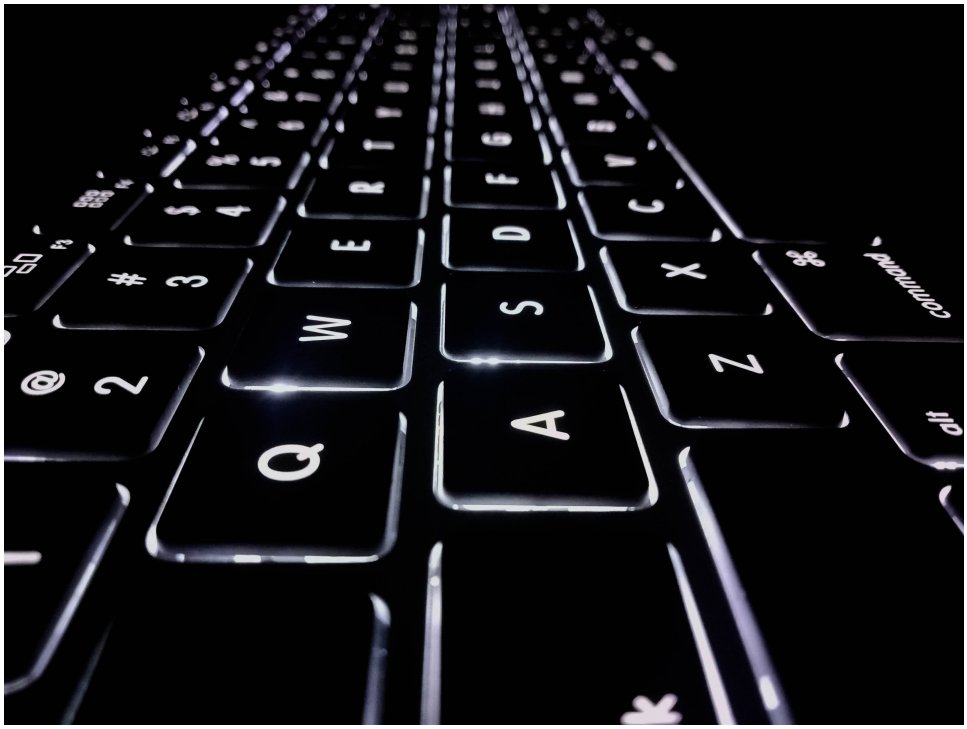

Assignment 4 ETC5513

Team name

XXXX

Contents

```
knitr::opts_chunk$set(echo = TRUE, message=FALSE, warning= FALSE)
```

```
library(tidyverse)
library(knitr)
library(readr)
library(lubridate)
library(bookdown)
```

```
# read data
storm17 <- read_csv("data/StormEvents_details-ftp_v1.0_d2017_c20200121.csv")
storm18 <- read_csv("data/StormEvents_details-ftp_v1.0_d2018_c20200317.csv")
storm19 <- read_csv("data/StormEvents_details-ftp_v1.0_d2019_c20200516.csv")

# change date format
clean <- function(x) {
x$BEGIN_DATE_TIME <- dmy_hms(x$BEGIN_DATE_TIME)
x$END_DATE_TIME <- dmy_hms(x$END_DATE_TIME)
x$BEGIN_DAY <- mday(x$BEGIN_DATE_TIME)
x$END_DAY <- mday(x$END_DATE_TIME)
x$BEGIN_TIME <- format(as.POSIXct(x$BEGIN_DATE_TIME) ,format = "%H:%M:%S")
x$END_TIME <- format(as.POSIXct(x$END_DATE_TIME) ,format = "%H:%M:%S")
x$MONTH_NAME <- month(x$BEGIN_DATE_TIME, label=TRUE)

#unselect column with NA value; unselect BEGIN MONTH and END MONTH because there are already MONTH colu
x <- x %>% select(-BEGIN_YEARMONTH, -END_YEARMONTH, -EPISODE_ID, -WFO, -CZ_TIMEZONE, -SOURCE, -MAGNITUDE
}

storm17 <- clean(storm17)
storm18 <- clean(storm18)
storm19 <- clean(storm19)
storm_all <- rbind(storm17,storm18,storm19)
```

1 Introduction

2 Methodology

3 Section 1

From the Table @ref(tab:stormtb) the top 10 numbers of storm events in America are all concentrate in 2017 and 2019 in the past three years. The thunderstorm wind happened most frequently, which is 18617 cases in 2019 and 16472 cases in 2017, after that is hail followed by 10398 in 2017 and 9013 in 2019.

Table 1: Top10 storm events in 3 years

EVENT_TYPE	YEAR	count
Thunderstorm Wind	2019	18617
Thunderstorm Wind	2017	16472
Hail	2017	10398
Hail	2019	9013
Flood	2019	4949
Flash Flood	2019	4072
Winter Weather	2019	3803
High Wind	2019	3772
Flash Flood	2017	3662
High Wind	2017	3536

Table @ref(tab:countstb) shows the top 10 numbers of storm events happened in America in 2019. first of all is thunderstorm wind happened 18617 times, after that is hail with 9013 cases and flood with 4949 cases and flash flood followed by 4072 cases. The other six are winter weather, high wind, winter storm, heavy snow, marine thunderstorm wind and tornado in order.

Table 2: Top5 storm event frequency in 2019

EVENT_TYPE	count
Thunderstorm Wind	18617
Hail	9013
Flood	4949
Flash Flood	4072
Winter Weather	3803

Figure @ref(fig:locationmap) shows the distributions of the most frequently happened five storm events' locations in 2019. It is clear to see that theses storm events happened more in eastern of America and some in the middle of America.

As for thunderstorm wind, Figure @ref(fig:TMmonth) shows the thunderstorm wind locations in America in 2019 of different months. It is clear to see that the most active months of thunderstorm wind were from May to August. Furthermore, the locations of theses events happened from middle and east of America slowly transformed to the east from July to October.

Table @ref(tab:statestb) displayed the number of thunderstorm wind happed in different states of America in 2019. As we can see from the table, except for Kansas, Texas and Missouri, the top ten states are all located in the east of America.

Table 3: Top10 states by number of thunderstorm in 2019

STATE	count
PENNSYLVANIA	1245
VIRGINIA	1199

STATE	count
TEXAS	1047
NEW YORK	903
OHIO	891
KANSAS	848
NORTH CAROLINA	791
GEORGIA	673
MISSOURI	648
SOUTH CAROLINA	619

Figure @ref(fig:monthplot) shows that the number of thunderstorm wind occurred in different states by month. The thunderstorm wind most frequently happened from May to August. However the peak of the number of such cases were different from some states, August is the peak month of some eastern America states like New York, Pennsylvania and Virginia, for the middle of America states like Texas and Missouri, the peak months were May and June.

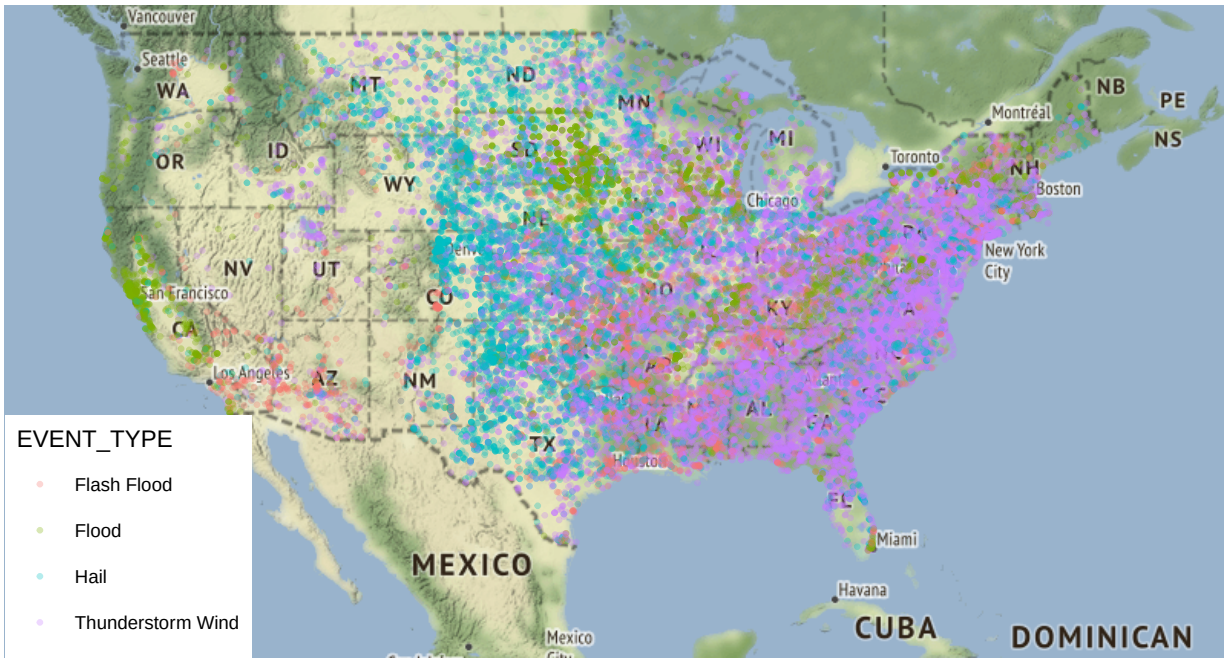

Figure 1: Top5 storm event locations in 2019

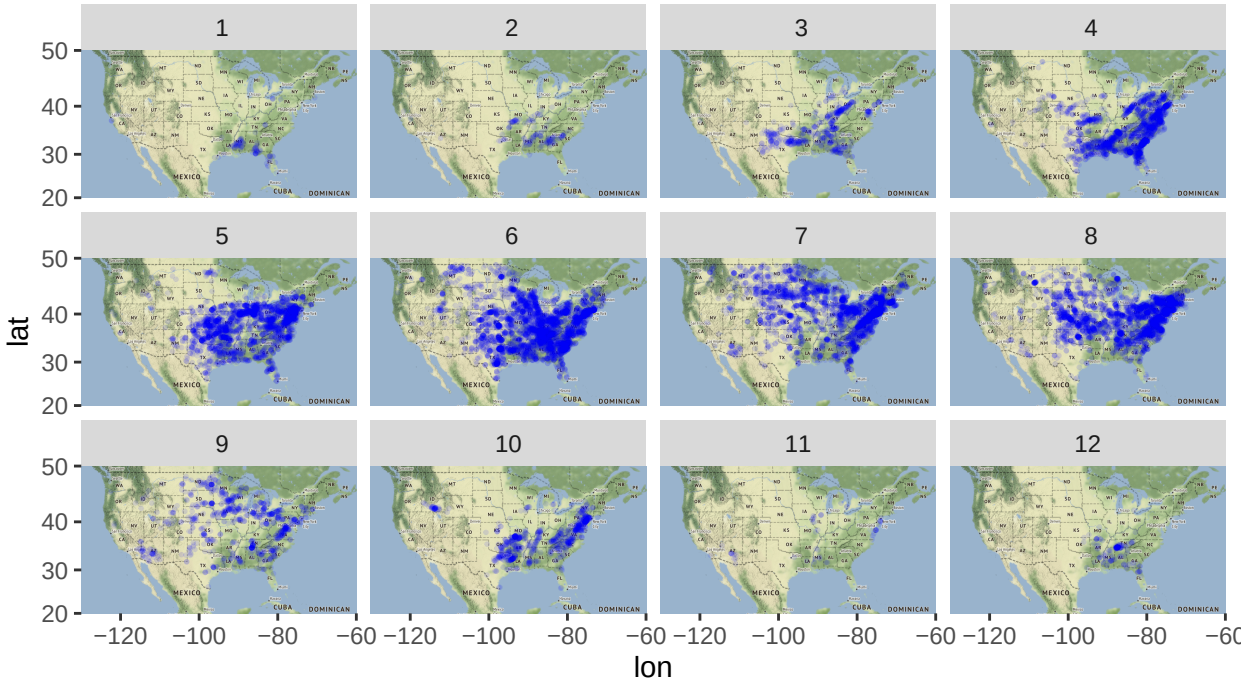

Figure 2: Thunderstorm locations by month in 2019

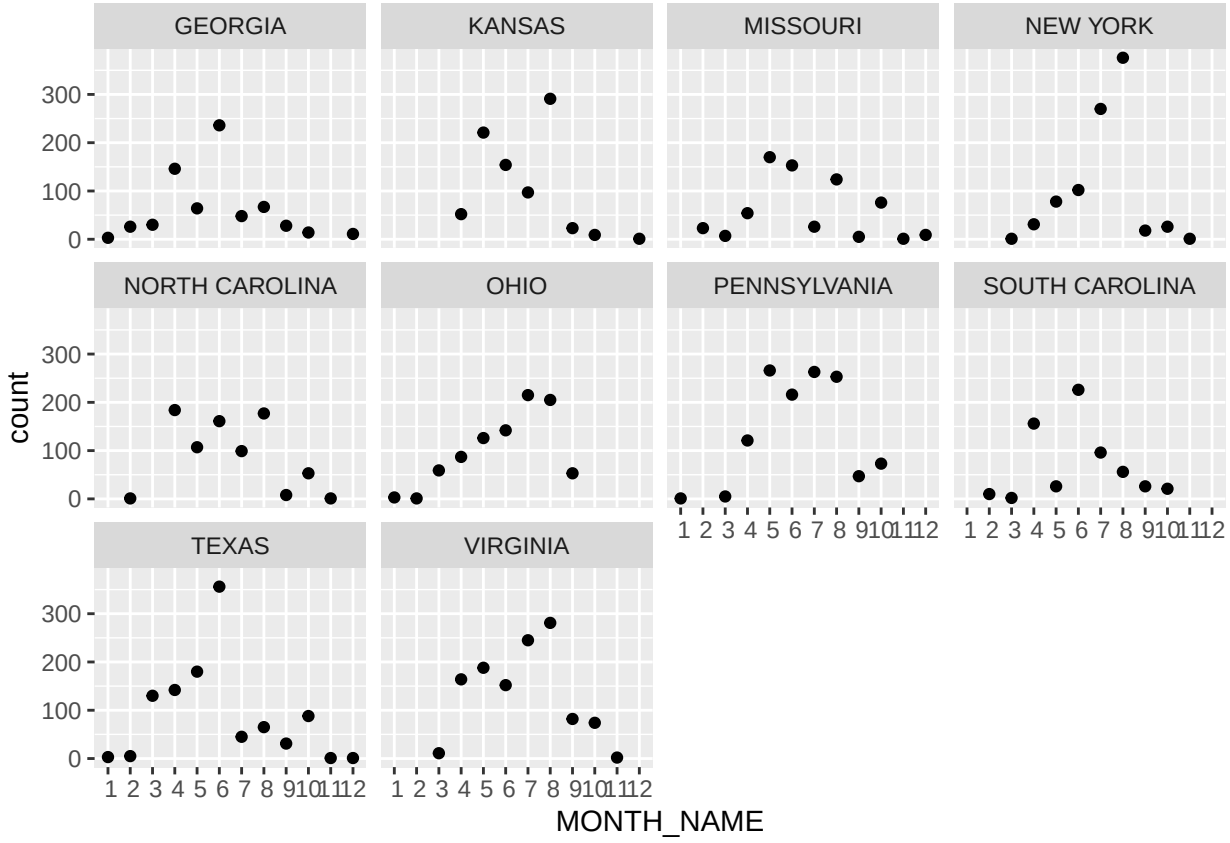

Figure 3: The nuber of thunderstorm events of top10 states in diffenrent month

4 Section 2

5 Section 3

6 Section 4

7 Conclusion

8 Citation examples

More styles for natbib here

Box and Cox [1964] and this is another article about COVID Bai et al. [2020] and I can also cite R packages as follows Wickham [2016]

References

Yan Bai, Lingsheng Yao, Tao Wei, Fei Tian, Dong-Yan Jin, Lijuan Chen, and Meiyun Wang. Presumed asymptomatic carrier transmission of covid-19. *Jama*, 323(14):1406–1407, 2020.

George E P Box and David R Cox. An analysis of transformations. *Journal of the Royal Statistical Society. Series B*, 26(2):211–252, 1964.

Hadley Wickham. *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York, 2016. ISBN 978-3-319-24277-4. URL https://ggplot2.tidyverse.org.