Static Code for App

Trever Yoder

Quarto

Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see https://quarto.org.

Running Code

When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:

```r
#Read in packages
library(httr)
library(jsonlite)
library(tidyverse)
library(lubridate)
library(shinydashboard)
```

query API

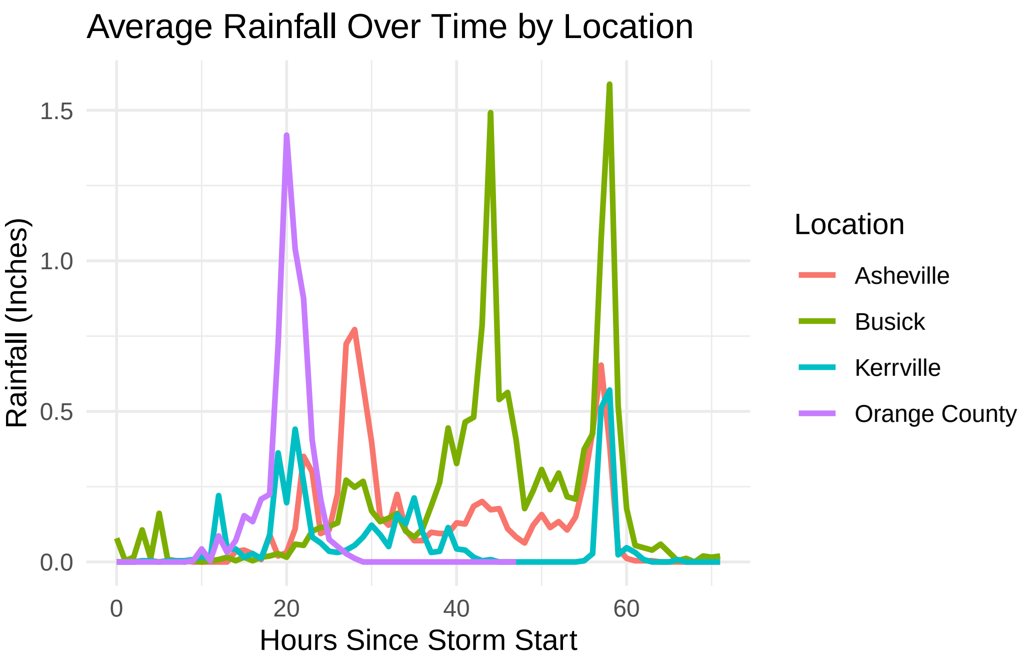
```r
data_rainfall_wind <- function(lat, lon, start_date, end_date, time_interval = "1 hours") {
  url <- "https://archive-api.open-meteo.com/v1/archive"
  response <- GET(url, query = list (
    latitude = lat,
    longitude = lon,
    start_date = start_date,
    end_date = end_date,
    hourly = "precipitation,wind_speed_10m,wind_gusts_10m",
    timezone = "auto"
  ))
  data1 <- fromJSON(content(response, as = "text"))
  df <- tibble(
    time = ymd_hm(data1$hourly$time),
    precipitation = data1$hourly$precipitation * 0.03937,
    wind_speed = data1$hourly$wind_speed_10m,
    wind_gust = data1$hourly$wind_gusts_10m
  )
  # 4-hour summary
  df_hr <- df %>%
    mutate(interval = floor_date(time, time_interval)) %>%
    group_by(interval) %>%
    summarize(
      precipitation_sum = sum(precipitation, na.rm = TRUE),
      wind_speed_avg = mean(wind_speed, na.rm = TRUE),
      wind_gust_max = max(wind_gust, na.rm = TRUE),
      .groups = "drop"
    )

  return(df_hr)
}

#Asheville Helene flood
rain_asheville_nc <- data_rainfall_wind(35.5975, -82.5461, "2024-09-25", "2024-09-27")

#Busick nc helene flood
rain_busick_nc <- data_rainfall_wind(35.7698, -82.1829, "2024-09-25", "2024-09-27")

#houston July 2025 flood
rain_kerrville_tx <-data_rainfall_wind(30.0474, -99., "2025-07-03", "2025-07-05")

#Nc Chantal July 2025 flood
rain_orangecounty_nc <- data_rainfall_wind(36.0263, -79.1097, "2025-07-06", "2025-07-07")

#add location and storm name
rain_asheville_nc <- rain_asheville_nc %>%
  mutate(location = "Asheville", storm_name = "Helene")

rain_busick_nc <- rain_busick_nc %>%
  mutate(location = "Busick", storm_name = "Helene")

rain_kerrville_tx <- rain_kerrville_tx %>%
  mutate(location = "Kerrville", storm_name = "Barry")
```

```
rain_orangecounty_nc <- rain_orangecounty_nc %>%
  mutate(location = "Orange County", storm_name = "Chantal")

#combine data sets into One
all_data <- bind_rows(rain_asheville_nc, rain_busick_nc, rain_kerrville_tx, rain_orangecounty

###manipulate data into hourly and cumulative rainfall for comparison purposes
hourly_all_data <- all_data %>%
  group_by(location) %>%
  mutate(
    hours_since_start = as.numeric(difftime(interval, min(interval), units = "hours")),
    cumulative_rainfall = cumsum(precipitation_sum)
  ) %>%
  ungroup()
```

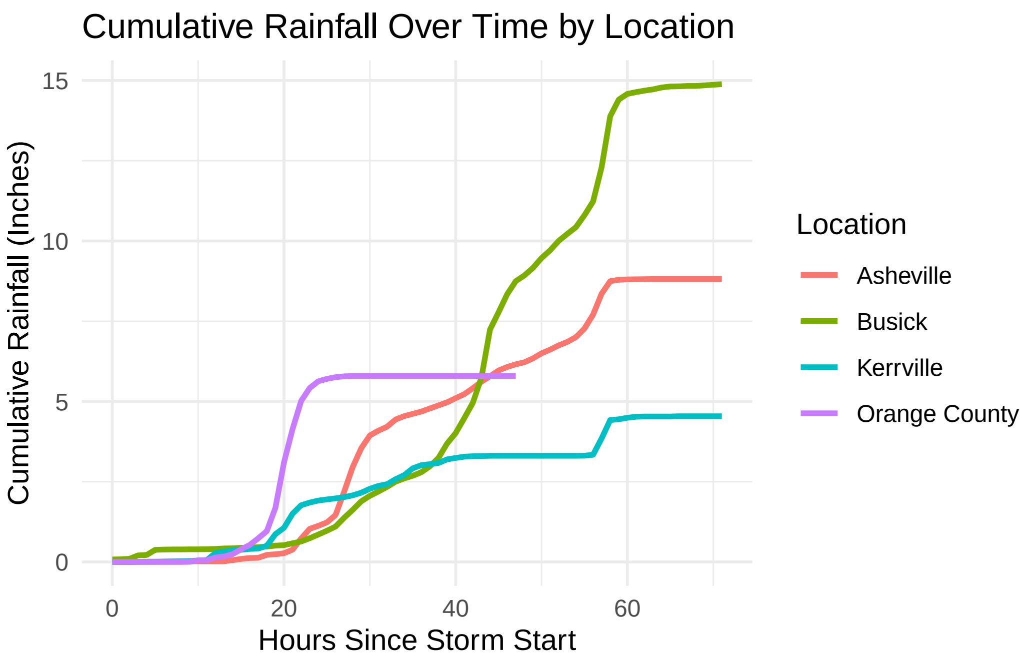
Now, let's create some summaries from this data

```
### Histograms #####
#### LINE PLOTS #######
#Rainfall
ggplot(hourly_all_data, aes(x = hours_since_start, y = precipitation_sum, color = location))
  geom_line(size = 1) +
  labs(title = "Average Rainfall Over Time by Location",
       x = "Hours Since Storm Start",
       y = "Rainfall (Inches)",
       color = "Location")  +
  theme_minimal()
```

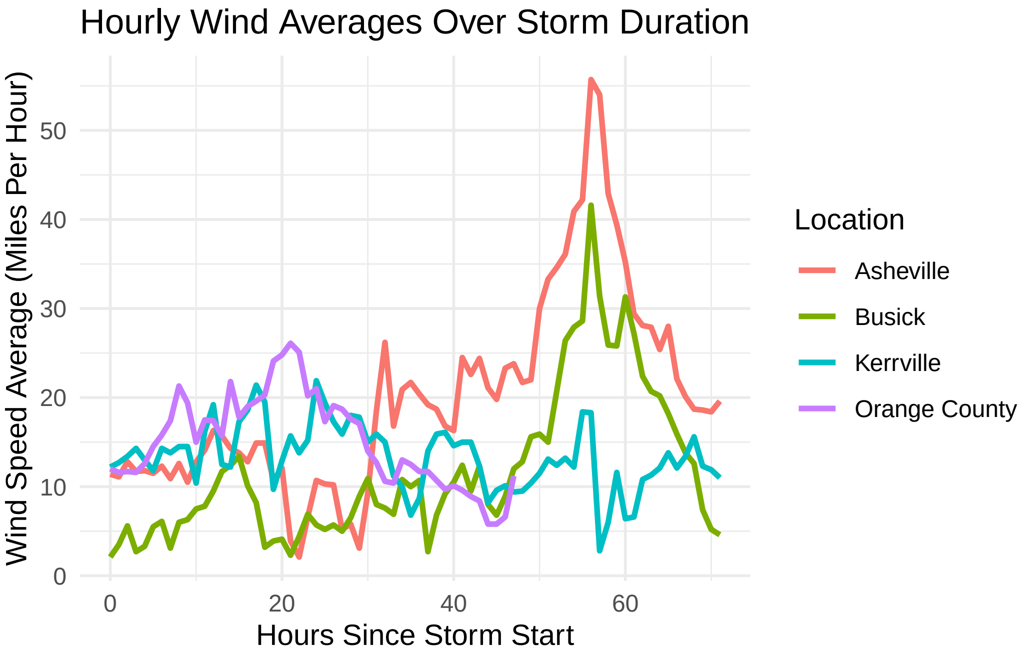
```
Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
i Please use `linewidth` instead.
```



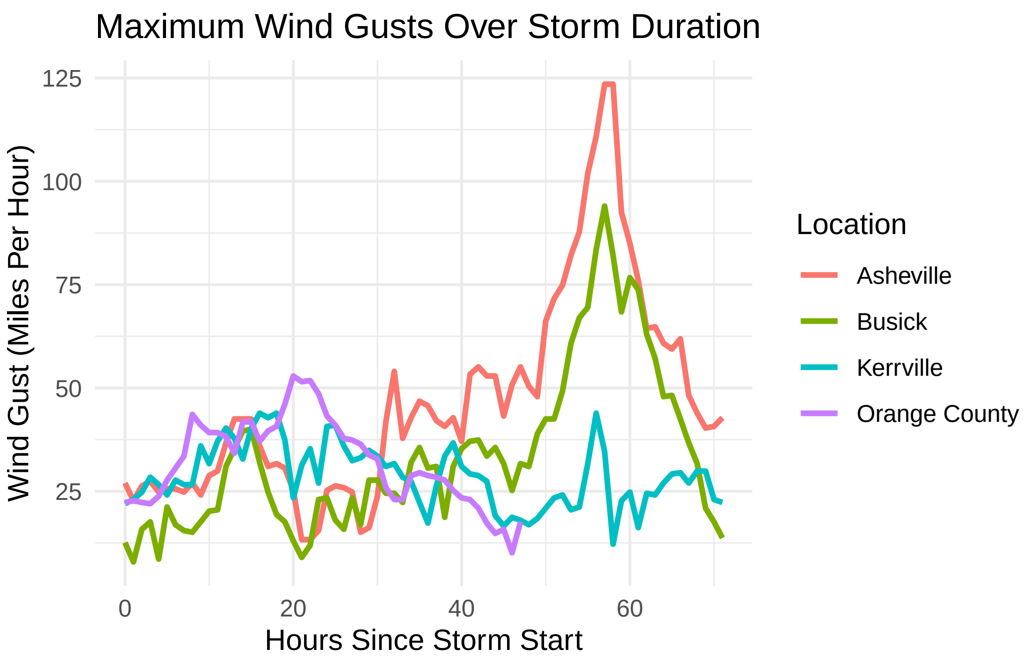
```
#Cumulative Rainfall
ggplot(hourly_all_data, aes(x = hours_since_start, y = cumulative_rainfall, color = location
  geom_line(size = 1) +
  labs(
    title = "Cumulative Rainfall Over Time by Location",
    x = "Hours Since Storm Start",
    y = "Cumulative Rainfall (Inches)",
    color = "Location"
  ) +
  theme_minimal()
```



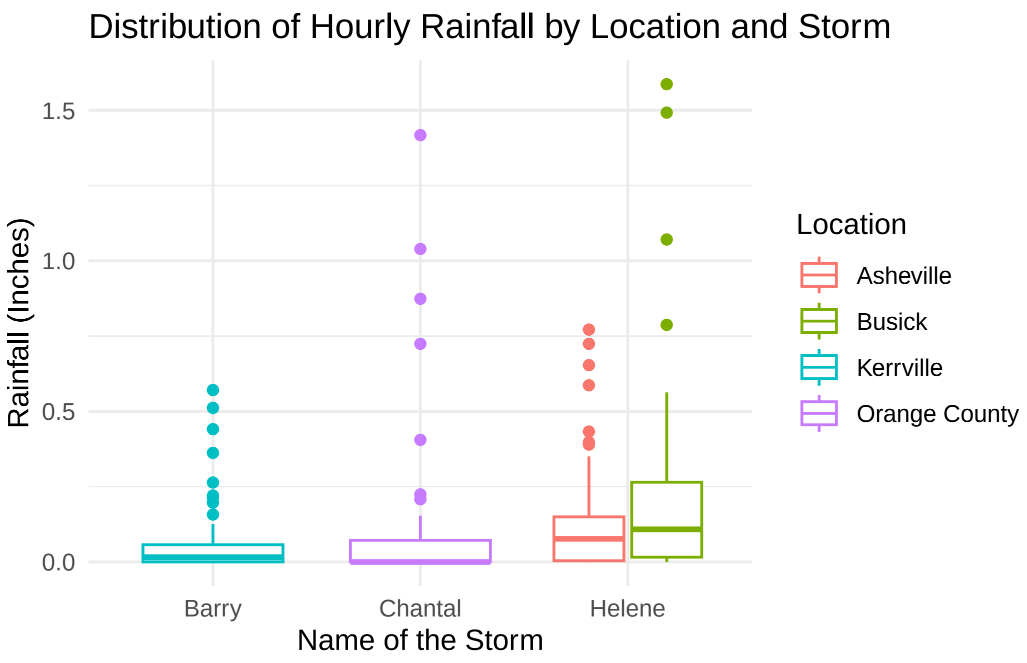
```
#Hourly Wind Averages
ggplot(hourly_all_data, aes(x = hours_since_start, y = wind_speed_avg, color = location)) +
  geom_line(size = 1) +
  labs(
    title = "Hourly Wind Averages Over Storm Duration",
    x = "Hours Since Storm Start",
    y = "Wind Speed Average (Miles Per Hour)",
    color = "Location"
  ) +
  theme_minimal()
```



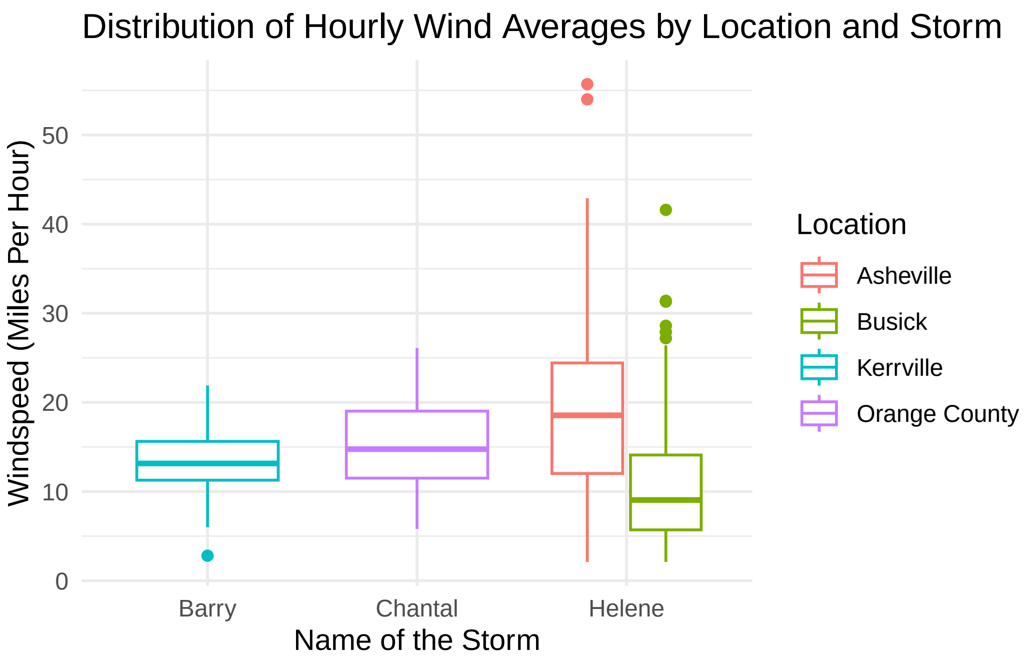
```
#Hourly Max Wind Gust
ggplot(hourly_all_data, aes(x = hours_since_start, y = wind_gust_max, color = location)) +
  geom_line(size = 1) +
  labs(
    title = "Maximum Wind Gusts Over Storm Duration",
    x = "Hours Since Storm Start",
    y = "Wind Gust (Miles Per Hour)",
    color = "Location"
  ) +
  theme_minimal()
```



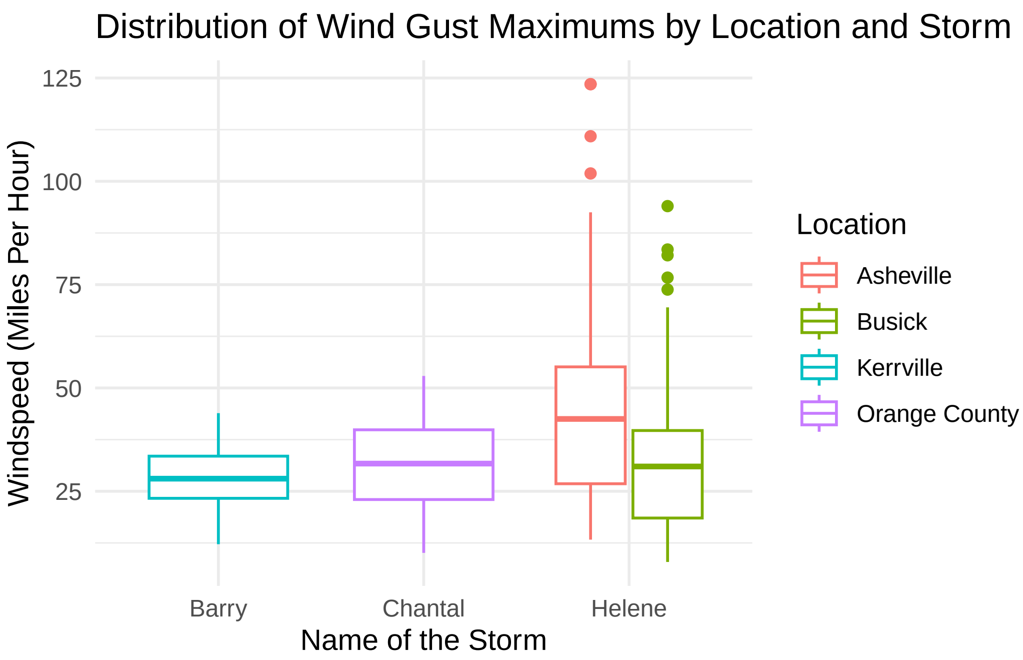
```
####BOX PLOTs#######
#Rainfall
ggplot(hourly_all_data, aes(x = storm_name, y = precipitation_sum, color = location)) +
  geom_boxplot() +
  labs(title = "Distribution of Hourly Rainfall by Location and Storm",
       x = "Name of the Storm",
       y = "Rainfall (Inches)",
       color = "Location")  +
  theme_minimal()
```



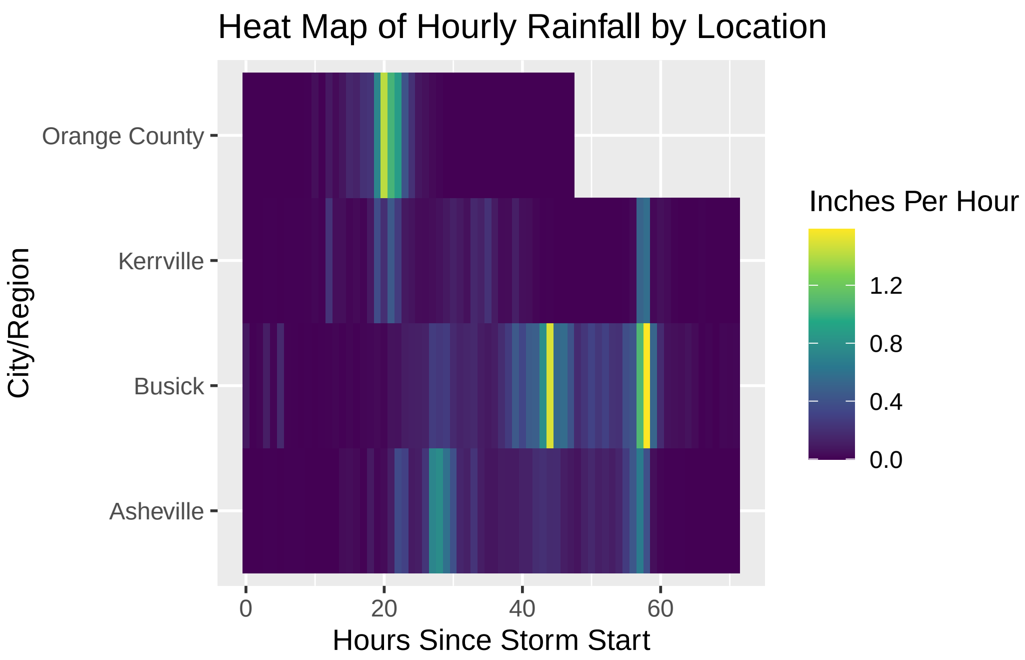
```
#Hourly Wind Averages
ggplot(hourly_all_data, aes(x = storm_name, y = wind_speed_avg, color = location)) +
  geom_boxplot() +
  labs(title = "Distribution of Hourly Wind Averages by Location and Storm",
       x = "Name of the Storm",
       y = "Windspeed (Miles Per Hour)",
       color = "Location")  +
  theme_minimal()
```



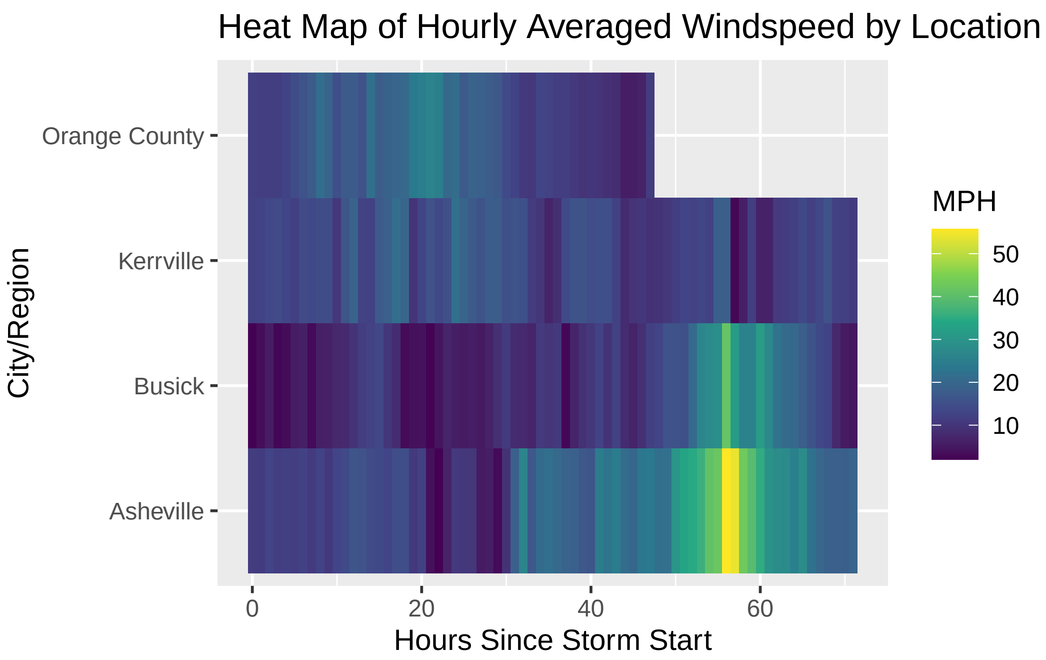
```
#Wind Gusts Maximums
ggplot(hourly_all_data, aes(x = storm_name, y = wind_gust_max, color = location)) +
  geom_boxplot() +
  labs(title = "Distribution of Wind Gust Maximums by Location and Storm",
       x = "Name of the Storm",
       y = "Windspeed (Miles Per Hour)",
       color = "Location")  +
  theme_minimal()
```



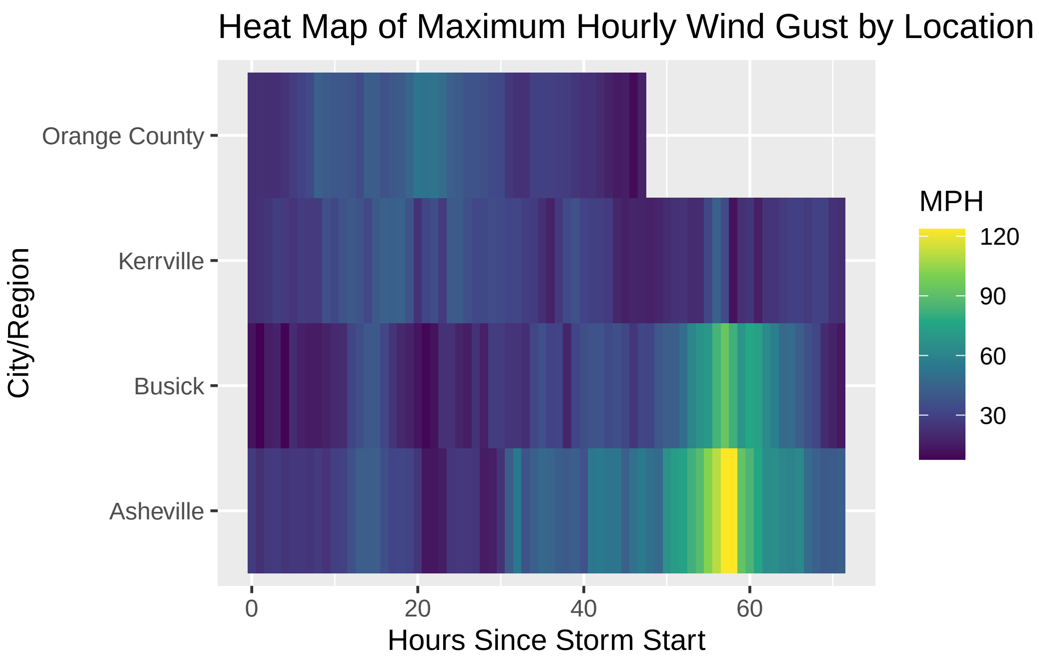
```
###HEAT MAPS####
#heat map rainfall
ggplot(hourly_all_data, aes(x = hours_since_start, y = location, fill = precipitation_sum)) +
  geom_tile() +
  labs(title = "Heat Map of Hourly Rainfall by Location",
       x = "Hours Since Storm Start",
       y = "City/Region",
       fill = "Inches Per Hour") +
  scale_fill_viridis_c()
```



```r
#heat map wind averages
ggplot(hourly_all_data, aes(x = hours_since_start, y = location, fill = wind_speed_avg)) +
  geom_tile() +
  labs(title = "Heat Map of Hourly Averaged Windspeed by Location",
       x = "Hours Since Storm Start",
       y = "City/Region",
       fill = "MPH") +
  scale_fill_viridis_c()
```



```
#heat map wing gusts
ggplot(hourly_all_data, aes(x = hours_since_start, y = location, fill = wind_gust_max)) +
  geom_tile() +
  labs(title = "Heat Map of Maximum Hourly Wind Gust by Location",
       x = "Hours Since Storm Start",
       y = "City/Region",
       fill = "MPH") +
  scale_fill_viridis_c()
```


Heat Map of Maximum Hourly Wind Gust by Location
City/Region
Orange County
Kerrville
Busick
Asheville
0
20
40
60
Hours Since Storm Start
MPH
120
90
60
30