

Precipitation Change in Durham

Web address for GitHub repository

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Initial steps * get data * Wrangle data * graph data to see what we're working with * try a seasonal Mann-kendall test * divide decades and see if there's a statistical significant difference * Optional: map of three schools in NC * Make presentation

Wrangle Data

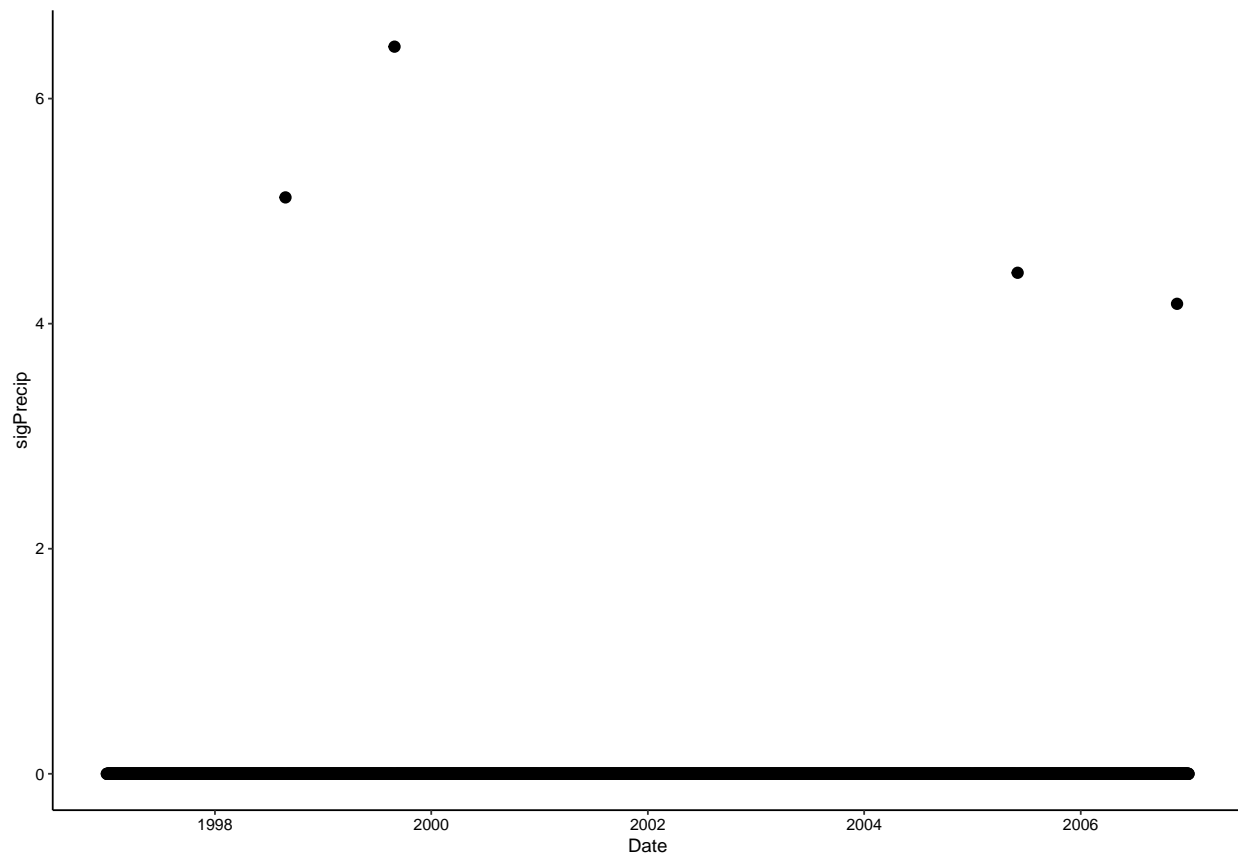
```
#Created monthly mean precipitation + total monthly precipitation dataset for Beaufort
Beaufort_Clean<- Beaufort_RAW%>%
  group_by(year,month)%>%
  summarise(meanmonthlyprecip= mean(Area.Weighted.Mean.Precipitation..mm.per.day.),
            sumMonthlyPrecip= sum(Area.Weighted.Mean.Precipitation..mm.per.day.))%>%
  mutate(Date= my(paste0(month,"-", year)))

## `summarise()` has grouped output by 'year'. You can override using the `.groups` argument

#10 year time frame, precipitation in inches (1997-01-01 to 2006-12-31) +significant 2
Beaufort_early<- Beaufort_RAW%>%
  mutate(PrecipInches= Area.Weighted.Mean.Precipitation..mm.per.day.*0.0394)%>%
  filter(Date> as.Date("1996-12-31"), Date< as.Date("2007-01-01"))%>%
  mutate(sigPrecip= ifelse(PrecipInches>3.66,PrecipInches,0),
         NumSigPrecip= ifelse(PrecipInches>3.66, 1,0))%>%
  select(Date, year, month,
         day_of_month, PrecipInches, sigPrecip, NumSigPrecip)%>%
  drop_na()

#Summary of number of sig events per year
Beaufort_early_summary<- Beaufort_early%>%
  group_by(year)%>%
  summarise(SigPrecipEvents= sum(NumSigPrecip))

#check results
ggplot(Beaufort_early, aes(x=Date, y=sigPrecip))+
  geom_point()
```



```
EarlyTable<- kable(Beaufort_early_summary)
EarlyTable
```

| year | SigPrecipEvents |
|------|-----------------|
| 1997 | 0 |
| 1998 | 1 |
| 1999 | 1 |
| 2000 | 0 |
| 2001 | 0 |
| 2002 | 0 |
| 2003 | 0 |
| 2004 | 0 |
| 2005 | 1 |
| 2006 | 1 |

#10 year time frame, precipitation in inches (2007-01-01 to 2016-12-30) +significant 2

```
Beaufort_Late<- Beaufort_RAW%>%
  mutate(PrecipInches= Area.Weighted.Mean.Precipitation..mm.per.day.*0.0394)%>%
  filter(Date> as.Date("2006-12-31"))%>%
  mutate(sigPrecip= ifelse(PrecipInches>3.66,PrecipInches,0),
         NumSigPrecip= ifelse(PrecipInches>3.66, 1,0))%>%
```

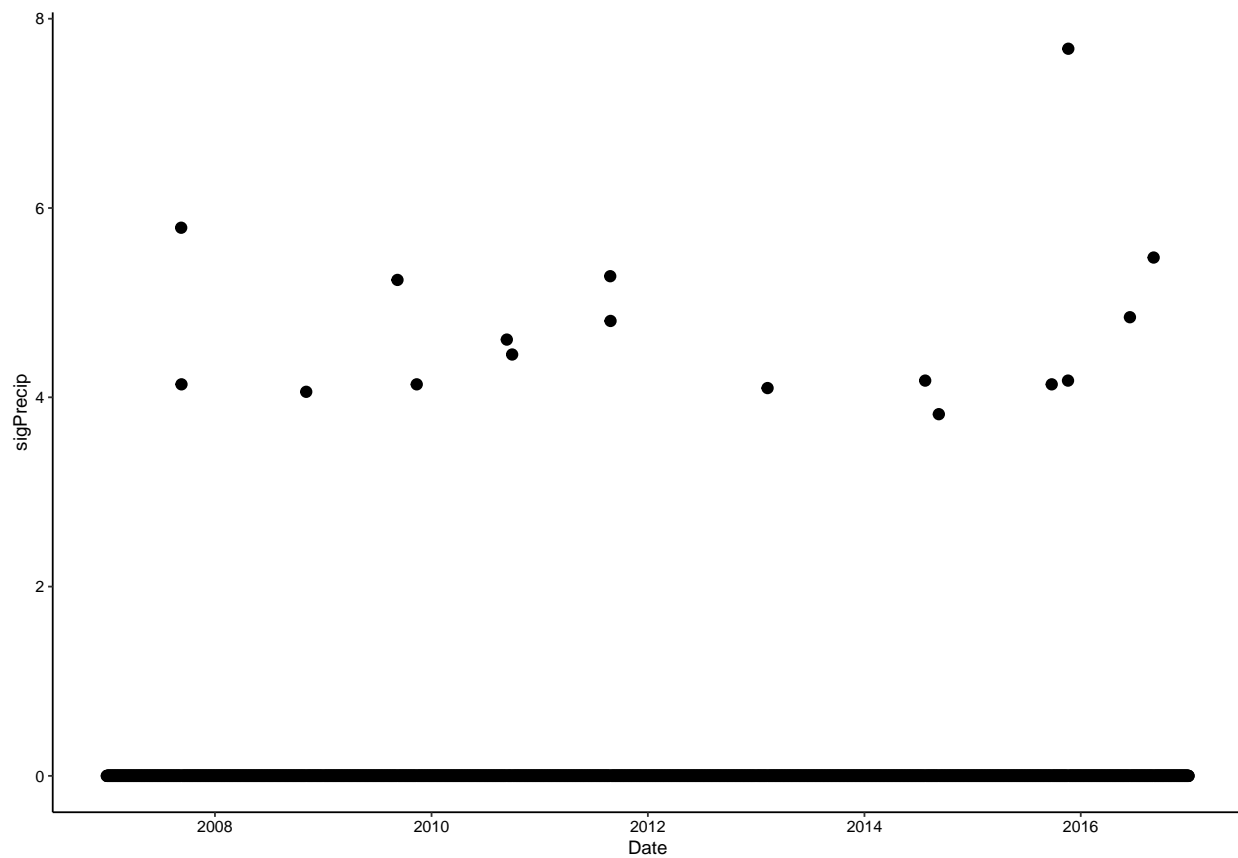
```

select(Date, year, month,
       day_of_month, PrecipInches, sigPrecip, NumSigPrecip)%>%
drop_na()

#Summary of number of sig events per year (Late)
Beaufort_late_summary<- Beaufort_Late%>%
  group_by(year)%>%
  summarise(SigPrecipEvents= sum(NumSigPrecip))

#check results
ggplot(Beaufort_Late, aes(x=Date, y=sigPrecip))+
  geom_point()

```



```

LateTable<- kable(Beaufort_late_summary)
LateTable

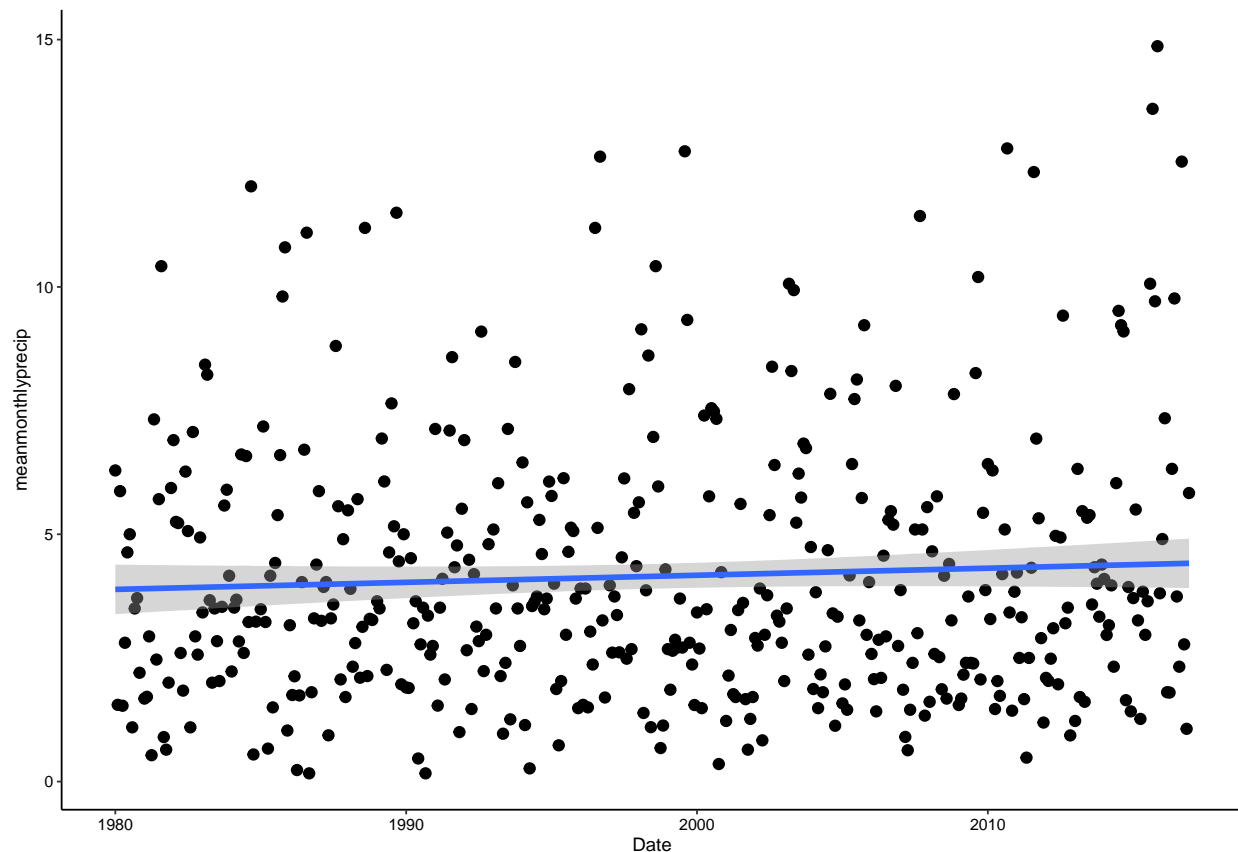
```

| year | SigPrecipEvents |
|------|-----------------|
| 2007 | 2 |
| 2008 | 1 |
| 2009 | 2 |
| 2010 | 2 |

| year | SigPrecipEvents |
|------|-----------------|
| 2011 | 2 |
| 2012 | 0 |
| 2013 | 1 |
| 2014 | 2 |
| 2015 | 3 |
| 2016 | 2 |

```
#plot mean monthly precip data to see rough trend
ggplot(Beaufort_Clean, aes(x=Date, y=meanmonthlyprecip))+
  geom_point()+
  geom_smooth(method = lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
## Warning: Removed 9 rows containing non-finite values (stat_smooth).
## Warning: Removed 9 rows containing missing values (geom_point).
```



```
#plot total monthly precip data to see rough trend
ggplot(Beaufort_Clean, aes(x=Date, y=sumMonthlyPrecip))+
  geom_point()+
```

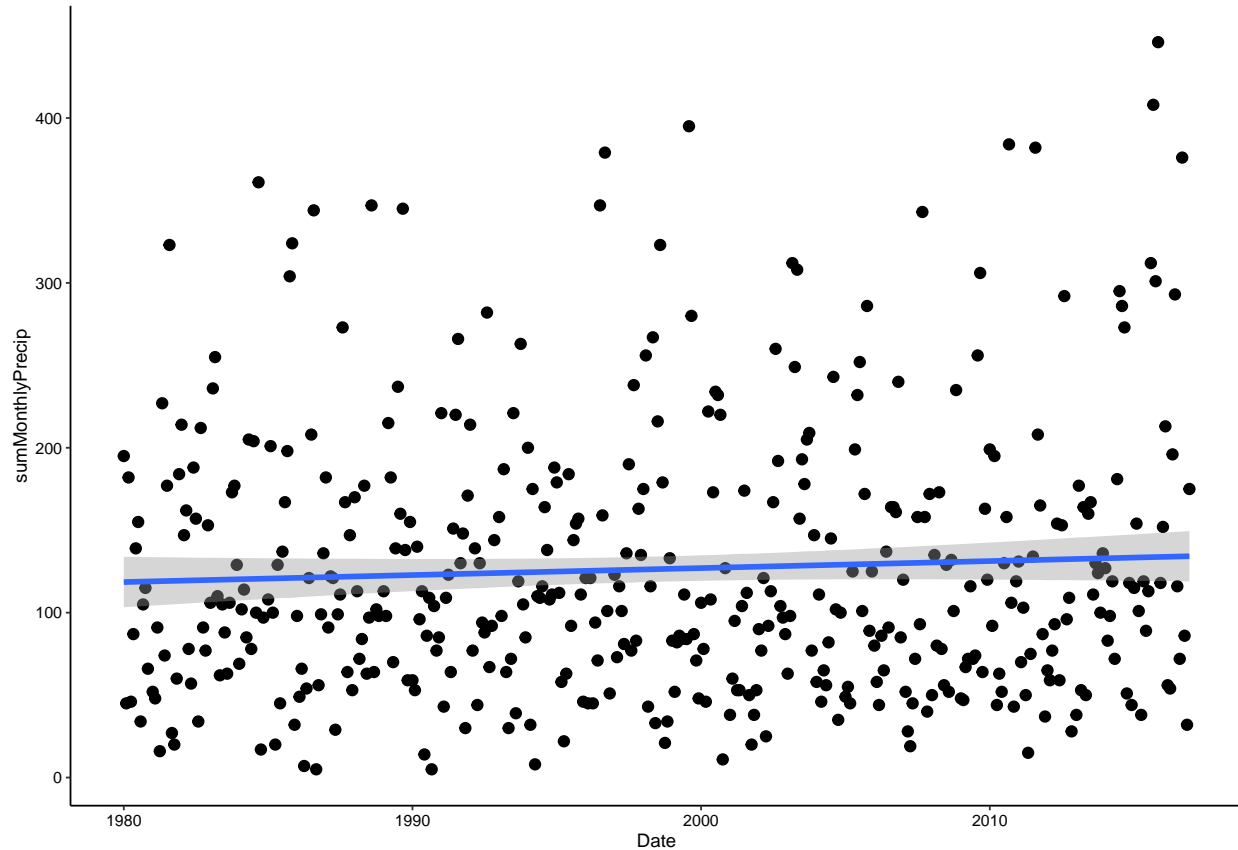


```
geom_smooth(method = lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
```

```
## Warning: Removed 9 rows containing non-finite values (stat_smooth).
```

```
## Warning: Removed 9 rows containing missing values (geom_point).
```



1 Rationale and Research Questions

We will be looking at the trends of precipitation over time for Beaufort, NC. helpful links: 1. <https://restorationsystems.com/projects/pancho-stream-wetland-nutrient-mitigation-bank/> 2. <https://www.landcan.org/local-resources/Brice-Creek-Wetland-Mitigation-Bank/41541/> 3. <https://restorationsystems.com/projects/cripple-creek-stream-wetland-mitigation-bank/#tab-id-2>

2 Dataset Information

** Significant precipitation events are considered “1 year events” using NOAA.

3 Exploratory Analysis

4 Analysis

4.1 Question 1: Is there is an increase in precipitation over time at Beaufort, NC?

- We will be using a Seasonal Kendall-Mann test to determine any trends in precipitation data.
- We will be using Seasonal Mann-Kendall test because precipitation has seasonal trends. We want to look at the precipitation trends without the variable of seasonality.

4.2 Question 2: Is there an increase in precipitation by decade?

- We will use a t-test to determine if there is a significant difference in number of significant precipitation events comparing decades.

5 Summary and Conclusions

6 References

<add references here if relevant, otherwise delete this section>