cyclone-data.R

Sony

2021-06-10

```r
#Libraries

library(dplyr)
```

```
## 
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
## 
##     filter, lag
```

```
## The following objects are masked from 'package:base':
## 
##     intersect, setdiff, setequal, union
```

```r
library(plotrix)
library(ggplot2)
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --
```

```
## v tibble  3.1.2      v purrr   0.3.4
## v tidyr   1.1.3      v stringr 1.4.0
## v readr   1.4.0      v forcats 0.5.1
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```r
library(scales)
```

```
## 
## Attaching package: 'scales'
```

```
## The following object is masked from 'package:purrr':
## 
##     discard
```

```
## The following object is masked from 'package:readr':
##
##     col_factor
```

```
## The following object is masked from 'package:plotrix':
##
##     rescale
```

```
library(ggplot2)

#Reading the file

d = read.csv('C:/Users/Sony/Downloads/cyclones.csv')

#Operations performed on dataset
print(head(d))
```

```
##        Name Lowest.Pressure..mbar. Year
## 1   BOB 02                     920 1990
## 2   BOB 05                     982 1998
## 3      03B                     992 2003
## 4   Yemyin                     986 2007
## 5 Khai-Muk                     996 2008
## 6    Laila                     986 2010
```

```
print(tail(d))
```

```
##        Name Lowest.Pressure..mbar. Year
## 40  Roanu                      983 2016
## 41  Kyant                      997 2016
## 42   Nada                     1000 2016
## 43 Vardah                      982 2016
## 44  Ockhi                      975 2017
## 45   Gaja                      995 2018
```

```
print(view(d))
```

```
##                    Name Lowest.Pressure..mbar. Year
## 1               BOB 02                     920 1990
## 2               BOB 05                     982 1998
## 3                  03B                     992 2003
## 4               Yemyin                     986 2007
## 5             Khai-Muk                     996 2008
## 6                Laila                     986 2010
## 7                Nilam                     982 2012
## 8                Helen                     990 2013
## 9                Lehar                     980 2013
## 10              Hudhud                     940 2014
## 11               Kyant                     997 2016
## 12             Fani[1]                     997 2019
## 13              ARB 02                     994 1994
## 14               Phyan                     988 2009
## 15 1970 Bhola Cyclone                     966 1970
## 16              BOB 03                     964 1981
## 17              BOB 03                     972 1988
## 18              BOB 07                     994 1997
## 19              BOB 06                     984 1998
## 20              BOB 04                     998 2000
## 21              BOB 03                     970 2002
## 22                Sidr                     944 2007
## 23              Rashmi                     996 2008
## 24                Aila                     970 2009
## 25               Komen                     986 2015
## 26               Roanu                     983 2016
## 27                Mora                     978 2017
## 28                Fani                     980 2019
## 29              BOB 09                     998 1991
## 30              BOB 06                     994 1992
## 31              BOB 03                     968 1993
## 32                 08B                     967 1996
## 33              BOB 05                     958 2000
## 34              Fanoos                     998 2005
## 35               Nisha                     996 2008
## 36                 Jal                     988 2010
## 37               Thane                     972 2011
## 38               Nilam                     992 2012
## 39                Madi                     986 2013
## 40               Roanu                     983 2016
## 41               Kyant                     997 2016
## 42                Nada                    1000 2016
## 43              Vardah                     982 2016
## 44               Ockhi                     975 2017
## 45                Gaja                     995 2018
```

```
print(sum(is.na(d)))
```

```
## [1] 0
```

```
print(summary(d))
```

```
##      Name            Lowest.Pressure..mbar.      Year
##  Length:45         Min.   : 920.0          Min.   :1970
##  Class :character  1st Qu.: 972.0          1st Qu.:1998
##  Mode  :character  Median : 986.0          Median :2009
##                    Mean   : 981.4          Mean   :2006
##                    3rd Qu.: 994.0          3rd Qu.:2015
##                    Max.   :1000.0          Max.   :2019
```

```
print(str(d))
```

```
## 'data.frame':    45 obs. of  3 variables:
##  $ Name                  : chr  "BOB 02" "BOB 05" "03B" "Yemyin" ...
##  $ Lowest.Pressure..mbar.: int  920 982 992 986 996 986 982 990 980 940 ...
##  $ Year                  : int  1990 1998 2003 2007 2008 2010 2012 2013 2013 2014
## ...
## NULL
```

```
print(class(d))
```

```
## [1] "data.frame"
```

```
print(typeof(d))
```

```
## [1] "list"
```

```
print(colnames(d))
```

```
## [1] "Name"                  "Lowest.Pressure..mbar." "Year"
```

```
colnames(d)[colnames(d) == 'Lowest.Pressure..mbar.'] <- 'LowestPressure'

print(ncol(d))
```

```
## [1] 3
```

```
print(nrow(d))
```

```
## [1] 45
```

```
print(min(d$LowestPressure))
```

```
## [1] 920
```

```
print(max(d$LowestPressure))
```

```
## [1] 1000
```

```
print(d[order(d$LowestPressure),])
```

```
##                   Name LowestPressure Year
## 1              BOB 02            920 1990
## 10             Hudhud            940 2014
## 22               Sidr            944 2007
## 33             BOB 05            958 2000
## 16             BOB 03            964 1981
## 15 1970 Bhola Cyclone            966 1970
## 32                08B            967 1996
## 31             BOB 03            968 1993
## 21             BOB 03            970 2002
## 24               Aila            970 2009
## 17             BOB 03            972 1988
## 37              Thane            972 2011
## 44              Ockhi            975 2017
## 27               Mora            978 2017
## 9               Lehar            980 2013
## 28               Fani            980 2019
## 2              BOB 05            982 1998
## 7               Nilam            982 2012
## 43             Vardah            982 2016
## 26              Roanu            983 2016
## 40              Roanu            983 2016
## 19             BOB 06            984 1998
## 4              Yemyin            986 2007
## 6               Laila            986 2010
## 25              Komen            986 2015
## 39               Madi            986 2013
## 14              Phyan            988 2009
## 36                Jal            988 2010
## 8               Helen            990 2013
## 3                 03B            992 2003
## 38              Nilam            992 2012
## 13             ARB 02            994 1994
## 18             BOB 07            994 1997
## 30             BOB 06            994 1992
## 45               Gaja            995 2018
## 5            Khai-Muk            996 2008
## 23             Rashmi            996 2008
## 35              Nisha            996 2008
## 11              Kyant            997 2016
## 12            Fani[1]            997 2019
## 41              Kyant            997 2016
## 20             BOB 04            998 2000
## 29             BOB 09            998 1991
## 34             Fanoos            998 2005
## 42               Nada           1000 2016
```

```
print(d[order(d$LowestPressure, decreasing = TRUE),])
```

```
##                   Name LowestPressure Year
## 42                Nada           1000 2016
## 20              BOB 04            998 2000
## 29              BOB 09            998 1991
## 34              Fanoos            998 2005
## 11               Kyant            997 2016
## 12             Fani[1]            997 2019
## 41               Kyant            997 2016
## 5             Khai-Muk            996 2008
## 23              Rashmi            996 2008
## 35               Nisha            996 2008
## 45                Gaja            995 2018
## 13              ARB 02            994 1994
## 18              BOB 07            994 1997
## 30              BOB 06            994 1992
## 3                  03B            992 2003
## 38               Nilam            992 2012
## 8                Helen            990 2013
## 14               Phyan            988 2009
## 36                 Jal            988 2010
## 4               Yemyin            986 2007
## 6                Laila            986 2010
## 25               Komen            986 2015
## 39                Madi            986 2013
## 19              BOB 06            984 1998
## 26               Roanu            983 2016
## 40               Roanu            983 2016
## 2               BOB 05            982 1998
## 7                Nilam            982 2012
## 43              Vardah            982 2016
## 9                Lehar            980 2013
## 28                Fani            980 2019
## 27                Mora            978 2017
## 44               Ockhi            975 2017
## 17              BOB 03            972 1988
## 37               Thane            972 2011
## 21              BOB 03            970 2002
## 24                Aila            970 2009
## 31              BOB 03            968 1993
## 32                 08B            967 1996
## 15 1970 Bhola Cyclone            966 1970
## 16              BOB 03            964 1981
## 33              BOB 05            958 2000
## 22                Sidr            944 2007
## 10              Hudhud            940 2014
## 1               BOB 02            920 1990
```

```
#List Data for Pressure greater than equal to 920 and less than equal to 940
Pressure_greater_than_920<-d$LowestPressure>=920 & d$LowestPressure<=940
which_over_pressure_920 <- which(Pressure_greater_than_920)
print(d[which_over_pressure_920,])
```

```
##       Name LowestPressure Year
## 1  BOB 02            920 1990
## 10 Hudhud            940 2014
```

```
#List Data for Pressure greater than equal to 940 and less than equal to 960
Pressure_greater_than_940<-d$LowestPressure>=940 & d$LowestPressure<=960
which_over_pressure_940 <- which(Pressure_greater_than_940)
print(d[which_over_pressure_940,])
```

```
##       Name LowestPressure Year
## 10 Hudhud            940 2014
## 22   Sidr            944 2007
## 33 BOB 05            958 2000
```

```
#List Data for Year equal to 2019
year_2019<-d$Year==2019
which_year_2019 <- which(year_2019)
print(d[which_year_2019,])
```

```
##       Name LowestPressure Year
## 12 Fani[1]            997 2019
## 28    Fani            980 2019
```

```
#List Data for Year equal to 2017
year_2017 = d$Year==2017
which_year_2017 <- which(year_2017)
print(d[which_year_2017,])
```

```
##     Name LowestPressure Year
## 27  Mora            978 2017
## 44 Ockhi            975 2017
```

```
#Select Name and Filter data with LowestPressure >= 970
d %>% filter(LowestPressure >= 970) %>% select(Name)
```

```
##          Name
## 1      BOB 05
## 2         03B
## 3      Yemyin
## 4    Khai-Muk
## 5       Laila
## 6       Nilam
## 7       Helen
## 8       Lehar
## 9       Kyant
## 10    Fani[1]
## 11     ARB 02
## 12      Phyan
## 13     BOB 03
## 14     BOB 07
## 15     BOB 06
## 16     BOB 04
## 17     BOB 03
## 18     Rashmi
## 19       Aila
## 20      Komen
## 21      Roanu
## 22       Mora
## 23       Fani
## 24     BOB 09
## 25     BOB 06
## 26     Fanoos
## 27      Nisha
## 28        Jal
## 29      Thane
## 30      Nilam
## 31       Madi
## 32      Roanu
## 33      Kyant
## 34       Nada
## 35     Vardah
## 36      Ockhi
## 37       Gaja
```

```
#Select Year and Filter data with LowestPressure > 980
d %>% filter(LowestPressure >= 980) %>% select(Year)
```

```
##    Year
## 1  1998
## 2  2003
## 3  2007
## 4  2008
## 5  2010
## 6  2012
## 7  2013
## 8  2013
## 9  2016
## 10 2019
## 11 1994
## 12 2009
## 13 1997
## 14 1998
## 15 2000
## 16 2008
## 17 2015
## 18 2016
## 19 2019
## 20 1991
## 21 1992
## 22 2005
## 23 2008
## 24 2010
## 25 2012
## 26 2013
## 27 2016
## 28 2016
## 29 2016
## 30 2016
## 31 2018
```

```
#Graphical Representation

plot(d$Year,d$LowestPressure,type='l',col='blue',lwd=2,xlab='Year',ylab='Pressure',ma
in='Line Graph for Year vs Pressure')
```

Line Graph for Year vs Pressure
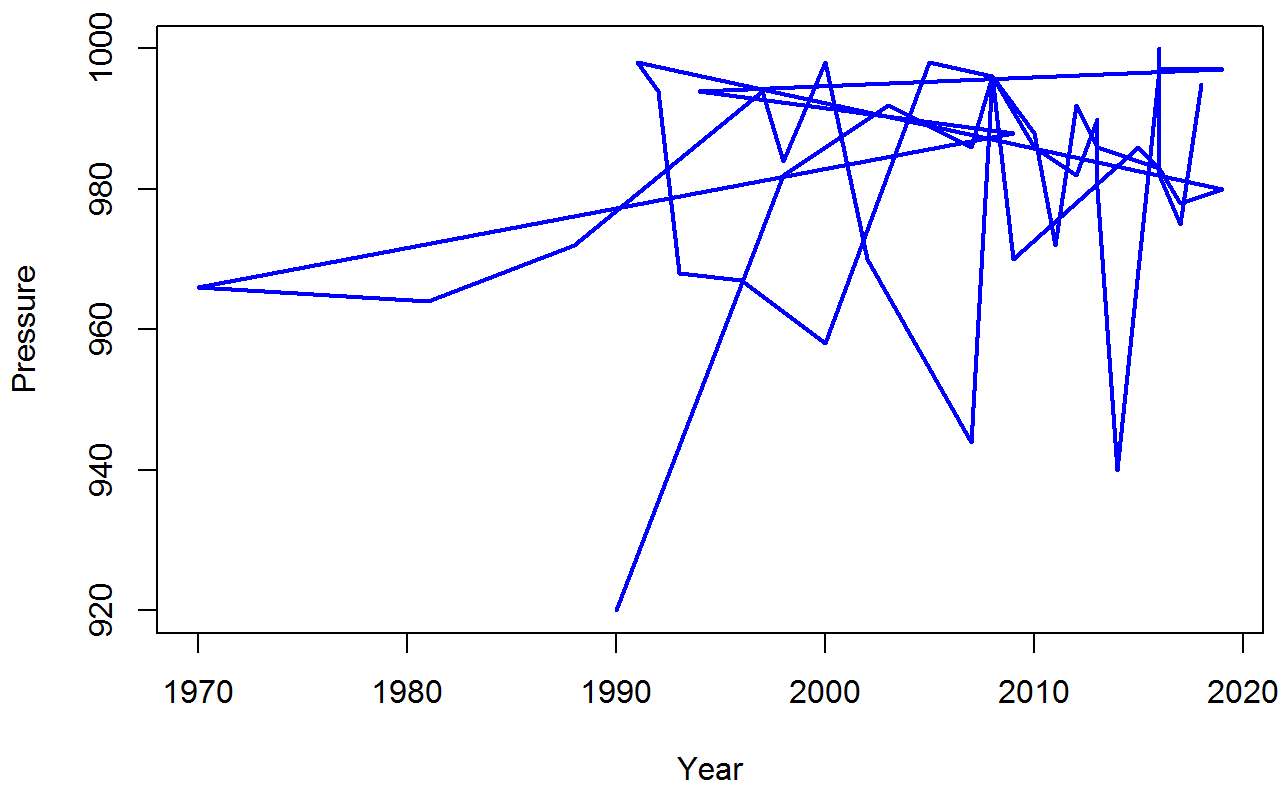

```
plot(d$Year,d$LowestPressure,main='Scatter Plot for Year vs Pressure',xlab='Year',yla
b='Pressure',col='red')
```

Scatter Plot for Year vs Pressure
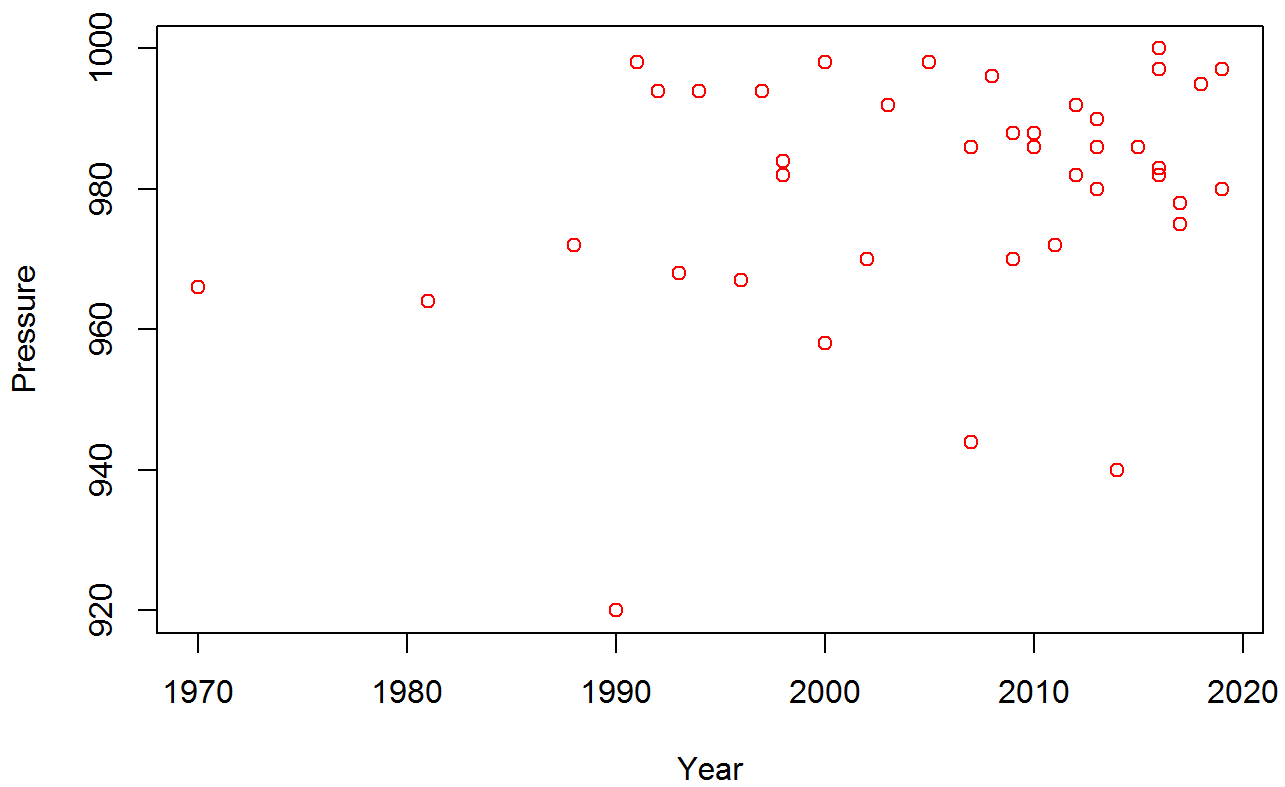

```
barplot(d$LowestPressure,names.arg = d$Year,col='green',xlab = 'Year',density=50,ylab
= 'Pressure',main='Bar Plot for Year vs Pressure')
```

Bar Plot for Year vs Pressure
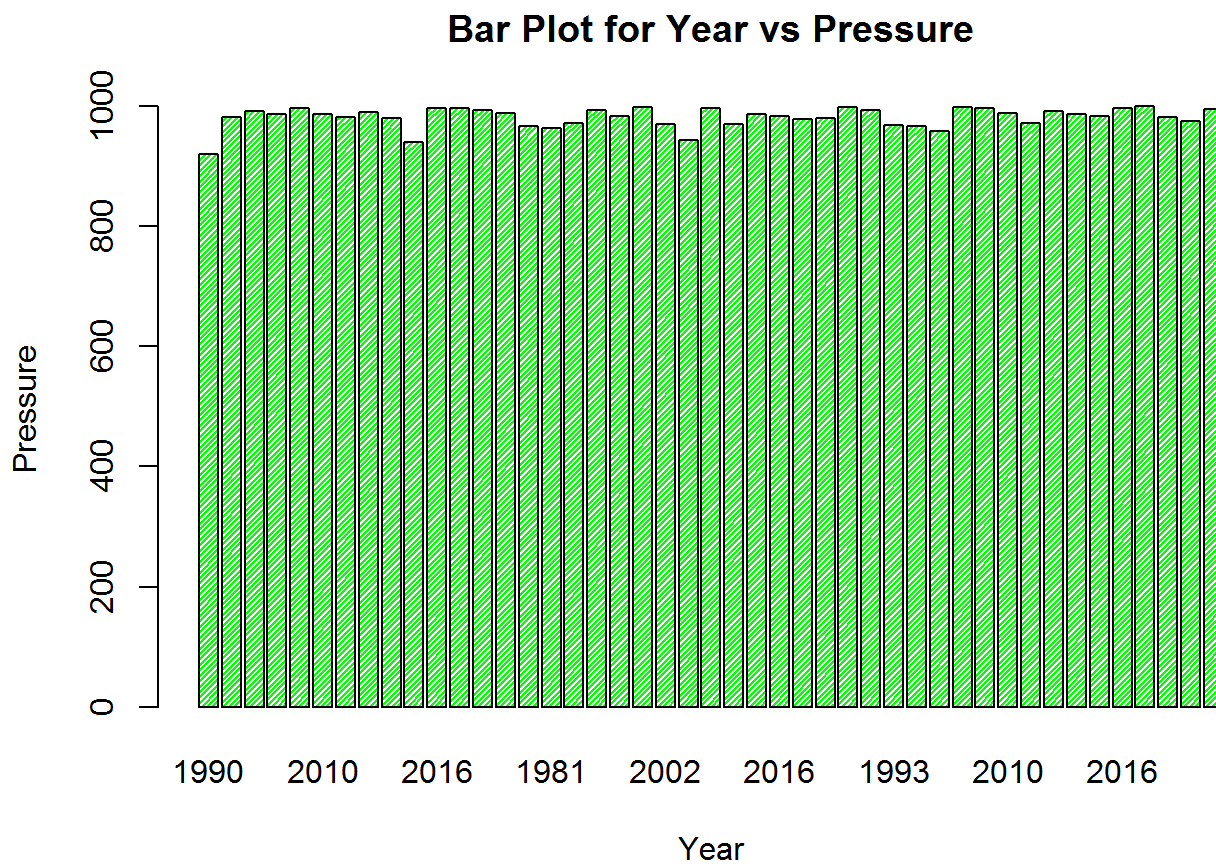

```
hist(d$Year,d$LowestPressure,breaks=15,col = 'yellow',density = 15,xlab = 'Year',ylab
= 'Pressure',main = 'Histogram for Year vs Pressure')
```

```
## Warning in if (freq) x$counts else x$density: the condition has length > 1 and
## only the first element will be used
```

Histogram for Year vs Pressure
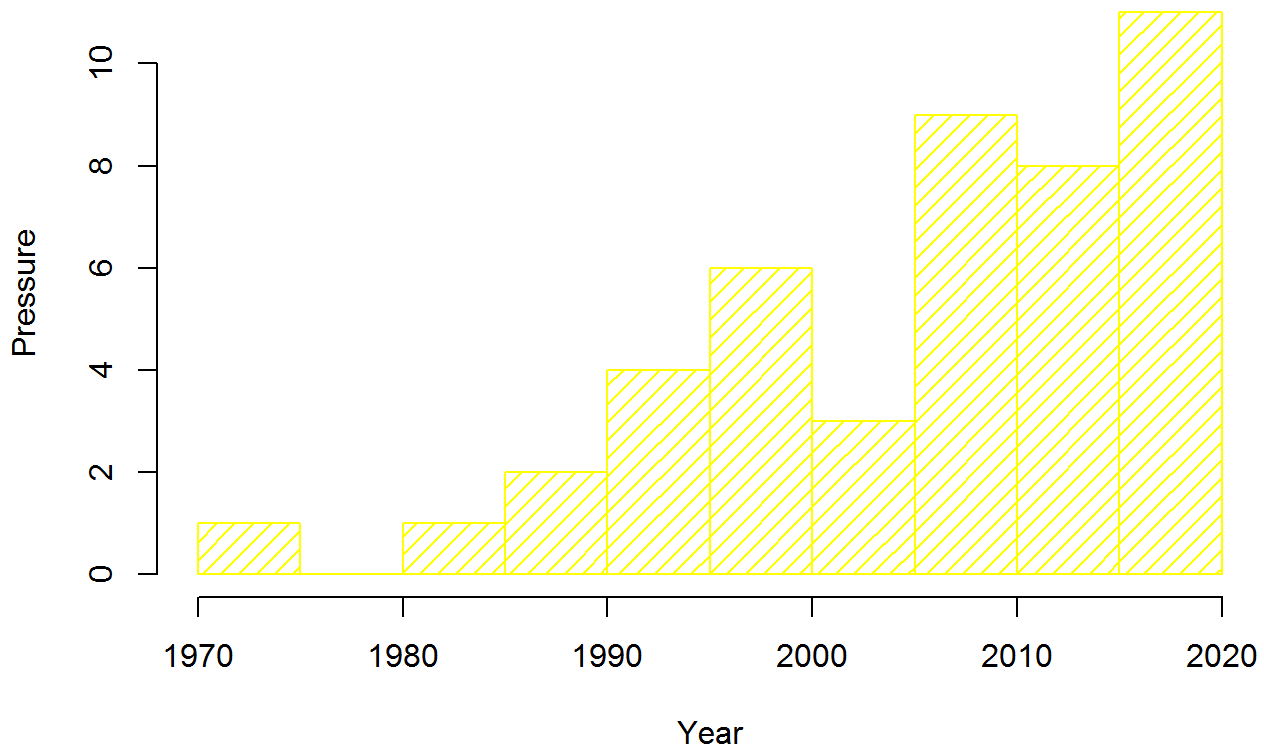

```
pie(d$LowestPressure,main = "Pie Chart for Cyclone Pressure",col = rainbow(length(d$L
owestPressure)))
```

# Pie Chart for Cyclone Pressure
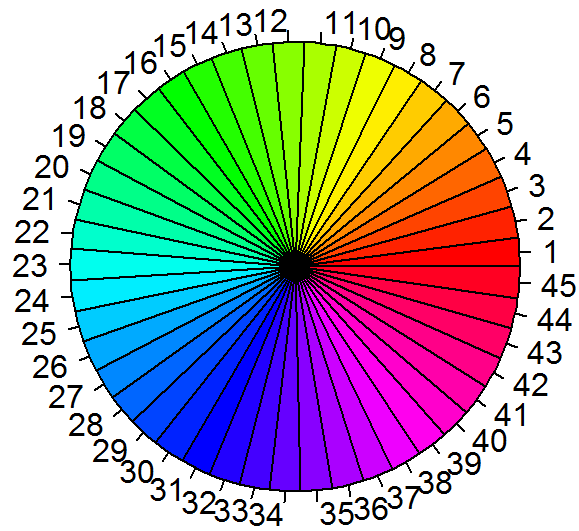

```
#ggplots(BoxPlot,ViolinPlot,LinePlot)

ggplot(d, aes(x=Year, y=LowestPressure,group=1)) + geom_boxplot(fill="slateblue", alp
ha=0.2) +
xlab("Year")+ylab("Lowest Pressure")
```
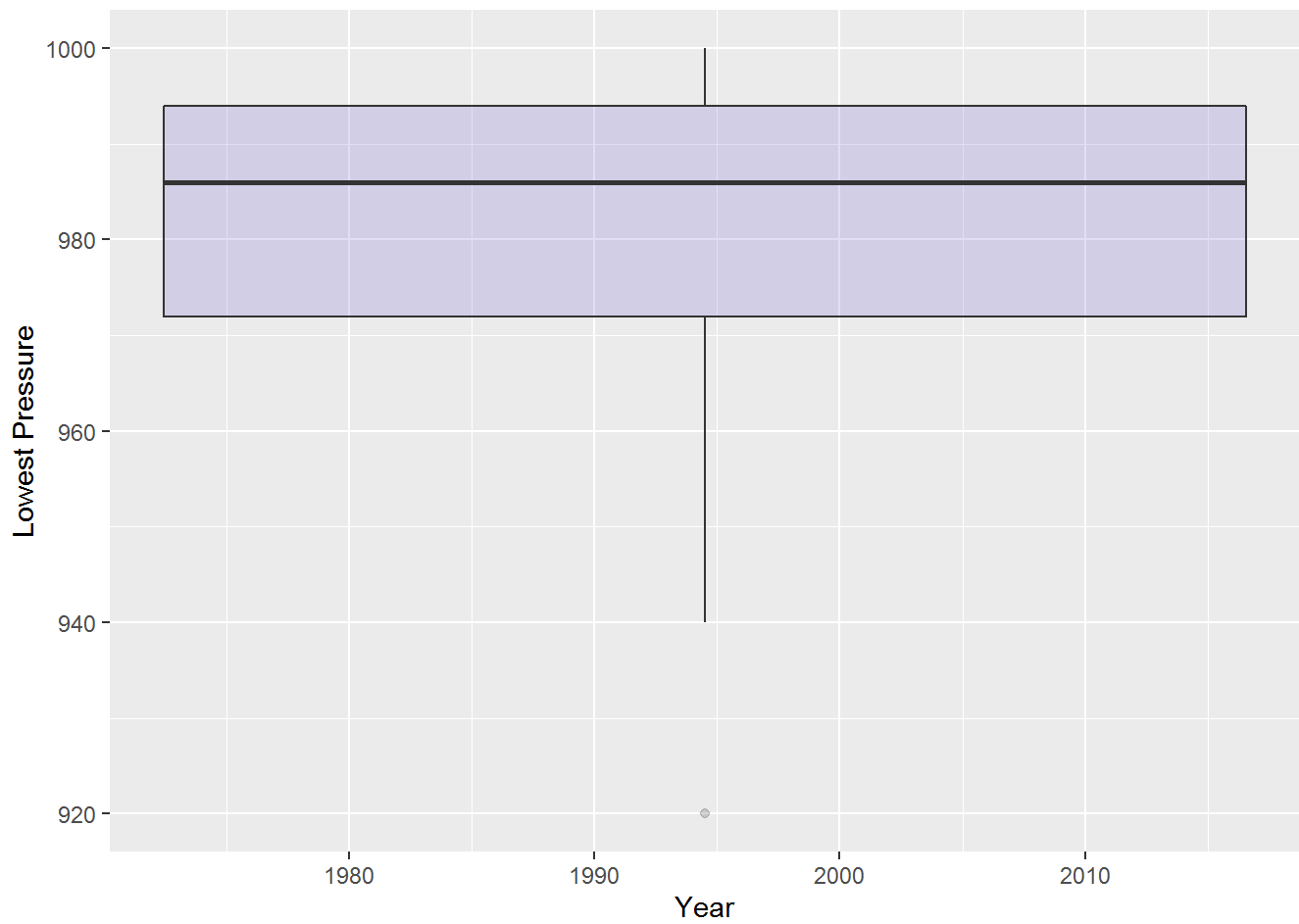
```
ggplot(data = d, mapping = aes(x=Year, y=LowestPressure, group=1)) + geom_boxplot(alp
ha=0) +
  geom_jitter(alpha = 0.3, color = "tomato") + xlab("Year") + ylab("Lowest Pressure")
```
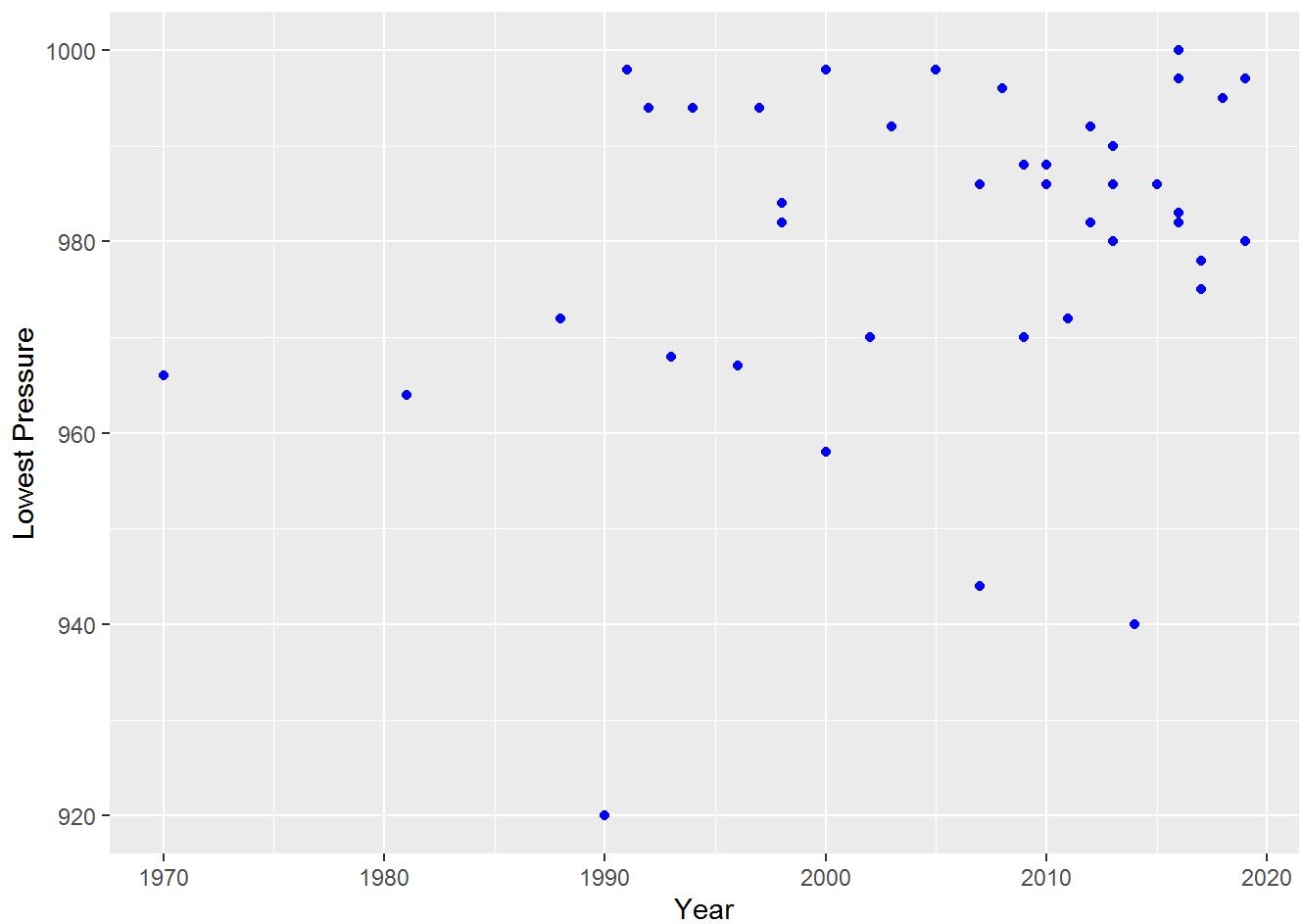
```
ggplot(d, aes(x=Year, y=LowestPressure,group=1)) + geom_violin(fill="yellow", alpha=
0.2) +
   xlab("Year")+ylab("Lowest Pressure")
```
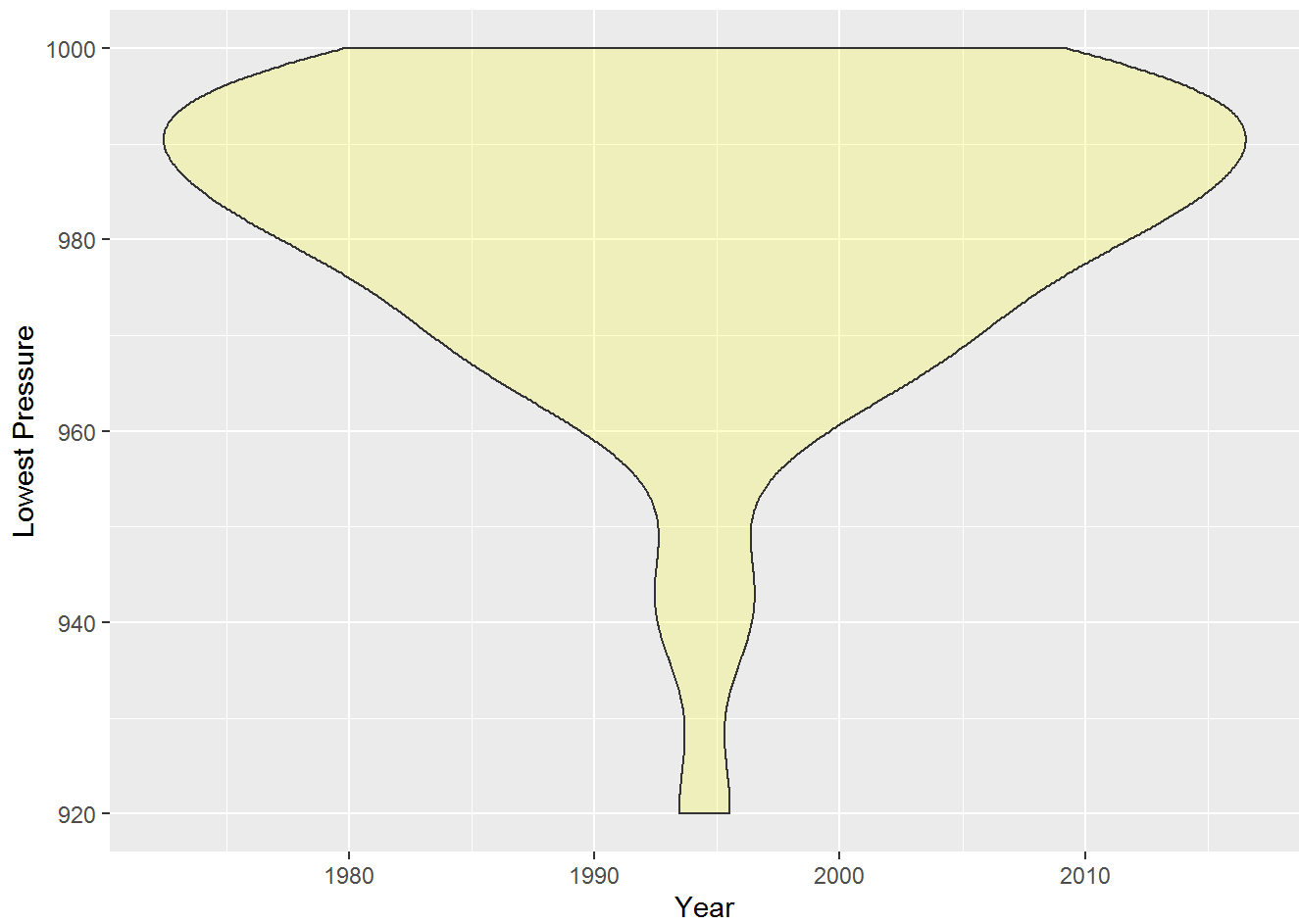
```
ggplot(data = d, aes(x = Year, y = LowestPressure, group = 1,genus)) +
  geom_line()
```

```
ggplot(data = d, aes(x = Year, y = LowestPressure)) + geom_point(color = "blue") + xl
ab("Year")+ylab("Lowest Pressure")
```

```
#Conclusion - The Analysis of the Cyclones (1970-2019) depicts that after the year 20
00, the cyclone pressure increased drastically.
#Since it is a natural calamity, we can just minimize the losses. The only way to do
that is by detecting prior itself about the cyclone and its density.
#Also, we can make proper barriers so that the density of the cyclone decreases to so
me level.
#Government will assign Natural Disaster Management Authority(NDMA) people to look in
to the disaster properly and accordingly evacuate the people to camps where people ca
n remain safe.
#Government will also give relief funds to the ones who have lost their homes and bel
ongings
```