Mappeoppgave 1

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Oppgave 1

```
library(tidyverse)
```

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

## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.6     v dplyr   1.0.7
## v tidyr   1.1.4     v stringr 1.4.0
## v readr   2.1.1     v forcats 0.5.1

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

```
library(ggplot2)
library(data.table)
```

```
##
## Attaching package: 'data.table'

## The following objects are masked from 'package:dplyr':
##
##     between, first, last

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

```
library(zoo)
```

```
##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
library(cowplot)
```

```
Global_temp <- fread("http://vortex.nsstc.uah.edu/data/msu/v6.0/tlt/uahncdc_lt_6.0.txt", sep = " ")
```

```
## Warning in fread("http://vortex.nsstc.uah.edu/data/msu/v6.0/tlt/
## uahncdc_lt_6.0.txt", : Stopped early on line 520. Expected 29 fields but found
## 0. Consider fill=TRUE and comment.char=. First discarded non-empty line: <<Trend
## 0.14 0.18 0.12 0.16 0.19 0.14 0.11 0.16 0.10 0.12 0.16 0.11 0.18 0.21 0.17 0.10
## 0.15 0.09 0.25 0.23 0.27 0.01 0.09 -0.02 0.18 0.18 0.18>>
```

```
#View(Global_temp)

Global_temp <- Global_temp [-c(518:526),]
```

```
## Warning in `[.data.table`(Global_temp, -c(518:526), ): Item 2 of i is -519 but
## there are only 518 rows. Ignoring this and 7 more like it out of 9.
```

```
str(Global_temp)
```

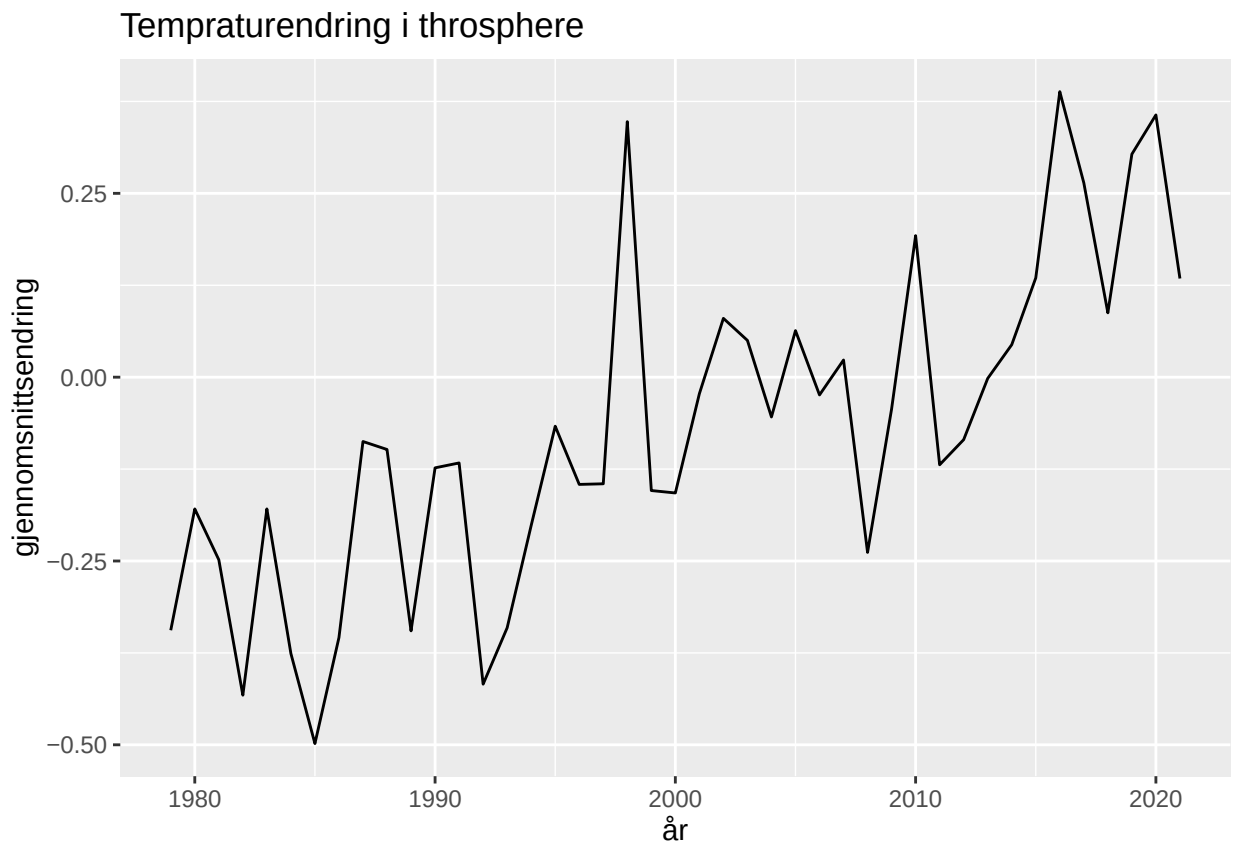
```
## Classes 'data.table' and 'data.frame':   517 obs. of  29 variables:
##  $ Year : chr  "1978" "1979" "1979" "1979" ...
##  $ Mo   : chr  "12" "1" "2" "3" ...
##  $ Globe: chr  "-0.48" "-0.47" "-0.43" "-0.38" ...
##  $ Land : chr  "-0.51" "-0.64" "-0.56" "-0.51" ...
##  $ Ocean: chr  "-0.47" "-0.41" "-0.39" "-0.33" ...
##  $ NH   : chr  "-0.44" "-0.64" "-0.47" "-0.46" ...
##  $ Land : chr  "-0.46" "-0.86" "-0.57" "-0.51" ...
##  $ Ocean: chr  "-0.42" "-0.50" "-0.41" "-0.44" ...
##  $ SH   : chr  "-0.52" "-0.31" "-0.39" "-0.30" ...
##  $ Land : chr  "-0.62" "-0.13" "-0.53" "-0.53" ...
##  $ Ocean: chr  "-0.50" "-0.34" "-0.37" "-0.26" ...
##  $ Trpcs: chr  "-0.60" "-0.47" "-0.36" "-0.36" ...
##  $ Land : chr  "-0.62" "-0.54" "-0.25" "-0.43" ...
##  $ Ocean: chr  "-0.59" "-0.45" "-0.39" "-0.34" ...
##  $ NoExt: chr  "-0.37" "-0.73" "-0.54" "-0.53" ...
##  $ Land : chr  "-0.44" "-0.93" "-0.67" "-0.53" ...
##  $ Ocean: chr  "-0.30" "-0.55" "-0.42" "-0.52" ...
##  $ SoExt: chr  "-0.46" "-0.23" "-0.41" "-0.26" ...
##  $ Land : chr  "-0.55" "0.12" "-0.70" "-0.59" ...
##  $ Ocean: chr  "-0.45" "-0.29" "-0.36" "-0.21" ...
##  $ NoPol: chr  "-0.39" "-0.46" "-2.00" "-0.56" ...
##  $ Land : chr  "-0.68" "-0.95" "-2.30" "-0.47" ...
##  $ Ocean: chr  "-0.06" "0.10" "-1.66" "-0.65" ...
##  $ SoPol: chr  "-0.45" "-0.16" "-0.80" "-0.53" ...
##  $ Land : chr  "-0.38" "-0.15" "-1.25" "-1.25" ...
##  $ Ocean: chr  "-0.49" "-0.16" "-0.58" "-0.18" ...
##  $ USA48: chr  "-1.29" "-3.22" "-1.76" "-0.70" ...
##  $ USA49: chr  "-1.15" "-2.42" "-1.84" "-0.38" ...
##  $ AUST : chr  "-1.29" "0.92" "-0.30" "0.23" ...
##  - attr(*, ".internal.selfref")=<externalptr>
```

```r
Global_temp <- as.data.frame(apply(Global_temp, 2, as.numeric))

str(Global_temp)
```

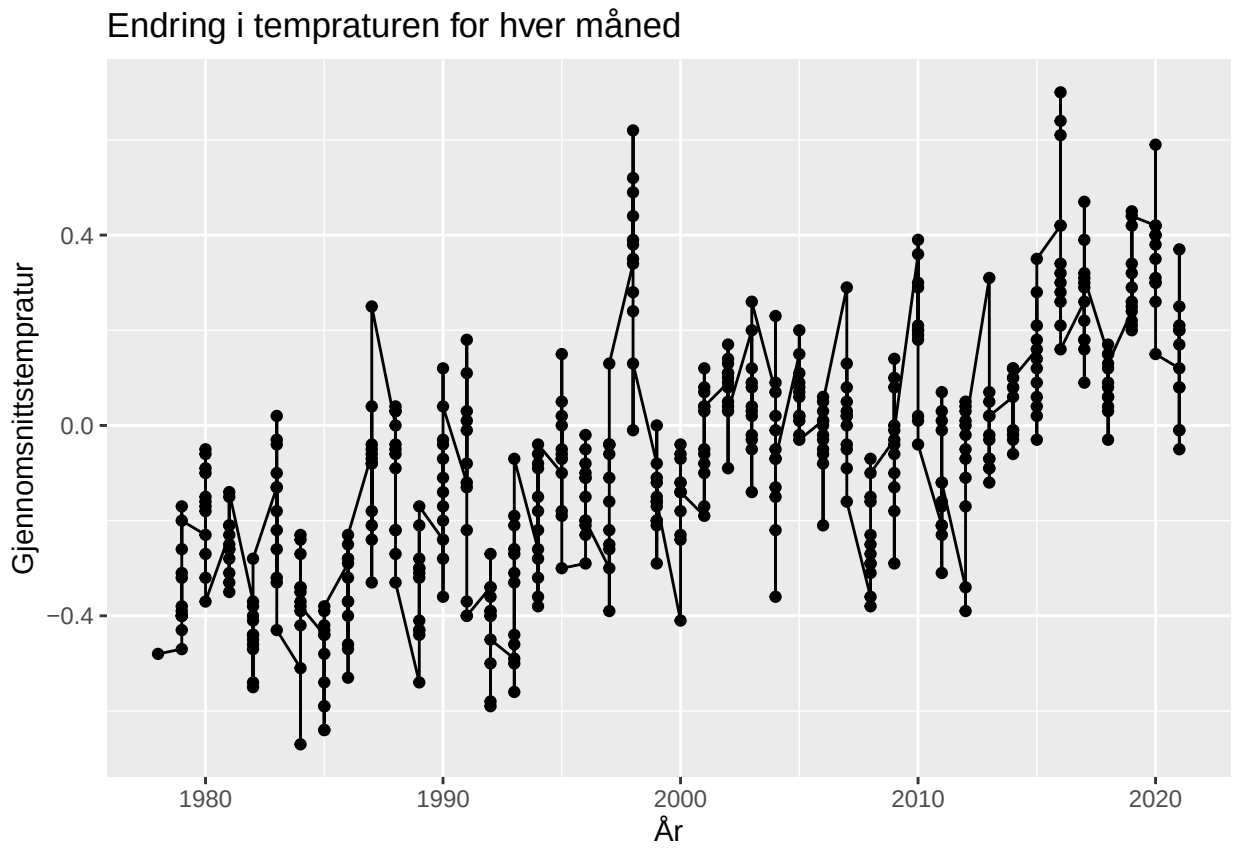
```
## 'data.frame':    517 obs. of  29 variables:
##  $ Year : num  1978 1979 1979 1979 1979 ...
##  $ Mo   : num  12 1 2 3 4 5 6 7 8 9 ...
##  $ Globe: num  -0.48 -0.47 -0.43 -0.38 -0.4 -0.4 -0.39 -0.31 -0.4 -0.32 ...
##  $ Land : num  -0.51 -0.64 -0.56 -0.51 -0.57 -0.56 -0.61 -0.57 -0.54 -0.44 ...
##  $ Ocean: num  -0.47 -0.41 -0.39 -0.33 -0.34 -0.33 -0.31 -0.21 -0.35 -0.28 ...
##  $ NH   : num  -0.44 -0.64 -0.47 -0.46 -0.47 -0.52 -0.5 -0.21 -0.34 -0.33 ...
##  $ Land : num  -0.46 -0.86 -0.57 -0.51 -0.62 -0.54 -0.61 -0.33 -0.37 -0.31 ...
##  $ Ocean: num  -0.42 -0.5 -0.41 -0.44 -0.37 -0.52 -0.44 -0.14 -0.32 -0.34 ...
##  $ SH   : num  -0.52 -0.31 -0.39 -0.3 -0.34 -0.27 -0.29 -0.41 -0.46 -0.32 ...
##  $ Land : num  -0.62 -0.13 -0.53 -0.53 -0.46 -0.62 -0.62 -1.11 -0.91 -0.73 ...
##  $ Ocean: num  -0.5 -0.34 -0.37 -0.26 -0.31 -0.19 -0.22 -0.26 -0.36 -0.23 ...
##  $ Trpcs: num  -0.6 -0.47 -0.36 -0.36 -0.35 -0.46 -0.37 -0.41 -0.37 -0.35 ...
##  $ Land : num  -0.62 -0.54 -0.25 -0.43 -0.37 -0.55 -0.49 -0.55 -0.35 -0.42 ...
##  $ Ocean: num  -0.59 -0.45 -0.39 -0.34 -0.34 -0.43 -0.33 -0.37 -0.38 -0.33 ...
##  $ NoExt: num  -0.37 -0.73 -0.54 -0.53 -0.54 -0.54 -0.55 -0.15 -0.36 -0.33 ...
##  $ Land : num  -0.44 -0.93 -0.67 -0.53 -0.72 -0.52 -0.63 -0.33 -0.43 -0.29 ...
##  $ Ocean: num  -0.3 -0.55 -0.42 -0.52 -0.38 -0.56 -0.48 0.01 -0.3 -0.36 ...
##  $ SoExt: num  -0.46 -0.23 -0.41 -0.26 -0.33 -0.18 -0.27 -0.37 -0.47 -0.29 ...
##  $ Land : num  -0.55 0.12 -0.7 -0.59 -0.43 -0.7 -0.74 -1.35 -1.17 -0.95 ...
##  $ Ocean: num  -0.45 -0.29 -0.36 -0.21 -0.31 -0.09 -0.19 -0.2 -0.34 -0.17 ...
##  $ NoPol: num  -0.39 -0.46 -2 -0.56 -0.84 -0.76 -0.76 -0.2 -0.26 -0.17 ...
##  $ Land : num  -0.68 -0.95 -2.3 -0.47 -0.81 -0.56 -1.14 -0.38 -0.35 -0.02 ...
##  $ Ocean: num  -0.06 0.1 -1.66 -0.65 -0.87 -1 -0.32 0.01 -0.15 -0.35 ...
##  $ SoPol: num  -0.45 -0.16 -0.8 -0.53 -0.26 0.05 -0.98 -0.95 -1 -0.11 ...
##  $ Land : num  -0.38 -0.15 -1.25 -1.25 0.26 -0.43 -1.62 -2.18 -1.67 -0.65 ...
##  $ Ocean: num  -0.49 -0.16 -0.58 -0.18 -0.51 0.27 -0.67 -0.37 -0.69 0.15 ...
##  $ USA48: num  -1.29 -3.22 -1.76 -0.7 -0.72 -0.82 -0.62 -0.15 -0.74 0.61 ...
##  $ USA49: num  -1.15 -2.42 -1.84 -0.38 -0.46 -0.75 -0.67 -0.09 -0.36 0.68 ...
##  $ AUST : num  -1.29 0.92 -0.3 0.23 -1.12 -1.1 -0.56 -1.16 -1.05 -0.76 ...
```

```r
#### Først legger vi inn dataene, så bruker vi funksjonen "Global <- Global [-c(518:526),]", så vi kan

keeps <- c("Year", "Mo", "Globe")
Global_temp <- Global_temp[keeps]

Global1 <- Global_temp %>%
  arrange(Year) %>%
  group_by(Year) %>%
  mutate(yearmean = rollmean(Globe, k = 12, fill = NA)) %>%
  ungroup()


Global2 <- Global1 %>% drop_na()
Global2 <- Global2 %>%
  rename(Filler = Globe,
         Globe=yearmean)

Global2 %>%
```

```
  ggplot(aes(x = Year, y = Globe)) +
  geom_line() +
  labs(title = "Tempraturendring i throsphere",
       x = "år",
       y = "gjennomsnittsendring")
```




```
Global1 %>%
  ggplot(aes(x = Year, y = Globe)) +
  geom_line(color = "black") + geom_point(color= "black") +
  labs(title = "Endring i tempraturen for hver måned",
       x = "År",
       y = "Gjennomsnittstempratur")
```



Tilslutt i oppgaven, så plotter vi. Vi lager ett som benytter funksjonen rollmean for å lage et snittplott, og ett plott som viser endringen i tempratur, for hver måned for de aktuelle årene.

Oppgave 2

```
Low_Trop <- fread("https://www.nsstc.uah.edu/data/msu/v6.0/tlt/uahncdc_lt_6.0.txt", sep = " ")
```

```
## Warning in fread("https://www.nsstc.uah.edu/data/msu/v6.0/tlt/
## uahncdc_lt_6.0.txt", : Stopped early on line 520. Expected 29 fields but found
## 0. Consider fill=TRUE and comment.char=. First discarded non-empty line: <<Trend
## 0.14 0.18 0.12 0.16 0.19 0.14 0.11 0.16 0.10 0.12 0.16 0.11 0.18 0.21 0.17 0.10
## 0.15 0.09 0.25 0.23 0.27 0.01 0.09 -0.02 0.18 0.18 0.18>>
```

```
Low_Trop <- Low_Trop[-c(518)]
Low_Trop <- as.data.frame(apply(Low_Trop, 2, as.numeric))

Mid_Trop <- fread("https://www.nsstc.uah.edu/data/msu/v6.0/tmt/uahncdc_mt_6.0.txt", sep = " ")
```

```
## Warning in fread("https://www.nsstc.uah.edu/data/msu/v6.0/tmt/
## uahncdc_mt_6.0.txt", : Stopped early on line 520. Expected 29 fields but found
## 0. Consider fill=TRUE and comment.char=. First discarded non-empty line: <<Trend
## 0.10 0.13 0.08 0.12 0.14 0.10 0.07 0.10 0.07 0.09 0.12 0.09 0.13 0.15 0.12 0.06
## 0.09 0.06 0.17 0.16 0.19 -0.02 0.01 -0.03 0.14 0.14 0.13>>
```

```
Mid_Trop <- Mid_Trop[-c(518)]
Mid_Trop <- as.data.frame(apply(Low_Trop, 2, as.numeric))

Trop <- fread("https://www.nsstc.uah.edu/data/msu/v6.0/ttp/uahncdc_tp_6.0.txt", sep = " ")
```

```
## Warning in fread("https://www.nsstc.uah.edu/data/msu/v6.0/ttp/
## uahncdc_tp_6.0.txt", : Stopped early on line 520. Expected 29 fields but found
## 0. Consider fill=TRUE and comment.char=. First discarded non-empty line: <<Trend
## 0.02 0.02 0.02 0.03 0.04 0.03 0.01 -0.00 0.01 0.03 0.04 0.03 0.03 0.04 0.03
## -0.01 -0.03 -0.00 0.02 0.02 0.03 -0.08 -0.13 -0.05 0.05 0.05 0.04>>
```

```
Trop <- Trop[-c(518)]
Trop <- as.data.frame(apply(Trop, 2, as.numeric))

Low_Strat <- fread("https://www.nsstc.uah.edu/data/msu/v6.0/tls/uahncdc_ls_6.0.txt", sep = " ")
```

```
## Warning in fread("https://www.nsstc.uah.edu/data/msu/v6.0/tls/
## uahncdc_ls_6.0.txt", : Stopped early on line 505. Expected 29 fields but found
## 28. Consider fill=TRUE and comment.char=. First discarded non-empty line: <<2020
## 11 -0.23 -0.96 0.05 0.05 -0.40 0.34 -0.52 -2.24 -0.16 1.29 1.26 1.31 -0.53 -0.78
## -0.30 -1.55 -5.03 -0.94 -1.85 -2.08 -1.58 -8.78-13.45 -6.57 -0.32 -1.04 0.53>>
```

```
Low_Strat <- as.data.frame(apply(Low_Strat, 2, as.numeric))

keep <- c("Year", "MO", "NoPol")
Low_Trop <- Low_Trop[keep,]
Mid_Trop <- Mid_Trop[keep,]
Trop <- Trop[keep,]
Low_Strat <- Low_Strat[keep,]

p1 <- Low_Trop %>%
  ggplot(aes(x = Year, y = NoPol)) +
  geom_line(col = "red") +
  geom_point(col = "red") +
  labs (title = "Lower Throsophere",
        x = " ",
        y = "Temprature")

p2 <- Mid_Trop %>%
  ggplot(aes(x = Year, y = NoPol)) +
  geom_line(col = "grey") +
  geom_point(col = "grey") +
  labs (title = "Mid Throsophere",
        x = " ",
        y = "Temprature")


p3 <- Trop %>%
  ggplot(aes(x = Year, y = NoPol)) +
  geom_line(col = "purple") +
  geom_point(col = "purple") +
  labs (title = "Trosphere",
```

```
        x = " ",
        y = "Temprature")


p4 <- Low_Strat %>%
  ggplot(aes(x = Year, y = NoPol)) +
  geom_line(col = "pink") +
  geom_point(col = "pink") +
  labs (title = "Lower stratosphere",
        x = " ",
        y = "Temprature")


#plot_grid(p1, p2, p3, p4, ncol =  4, labels = "AUTO")
```

Plot_grid funksjonen vår fungerte ikke, men hvis den hadde funket, så ville vi fått opp fire ulike grafer ved siden av hverandre får hver av de ulike trosfærene.