# Is the global temperature increasing?

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## 1 Introduction

According the the IPCC, the temperature has been changing about 0.X degrees per XX years – but how is this value derived? How reliable is the value?

### 1.1 Learning Goals

For this project, you will evaluate determine if the Earth's temperature has in fact changed, and if so, by how much?

### 1.2 Driving Question

Is my region's climate changing?
How does climate change impact my community?

### 1.3 Public Product

Narrative Blog...
with professional graphics and statistics.

### 1.4 Approach

## 2 Procedures

### 2.1 How is temperature data collected?

### 2.2 How are the data store, curated and checked for quality?

## 3 Data Source

### 3.1 Compressed Files

```r
# Uncompress the files.
# ghcnd_all

tarfile = "C:\\workspace\\GitHub\\RTricks\\300_Global_Warming\\Raw Data\\ghcnd_all.tar.gz"

#ftpsource = ftp://ftp.ncdc.noaa.gov/pub/data/ghcn/v3/ghcnm.tmax.latest.qca.tar.gz


#ghcnm.tmax.latests.qca.tar.qz
tarfile = "C:\\workspace\\GitHub\\RTricks\\300_Global_Warming\\Raw Data\\ghcnm.tmax.latest.q
# untar(tarfile)


#stationfile = "C:\\workspace\\GitHub\\RTricks\\300_Global_Warming\\Raw Data\\ghcnd-stations
```

## 3.2   Uptain Locations

```r
# read.table(stationfile, header=F, fill=T, row.names=NULL); head(stations)
stations = (read.fwf(stationfile, fill=T, widths= c(11, 9, 10, 7, 3, 32, 3, 4, 9), ))

## Error in read.fwf(stationfile, fill = T, widths = c(11, 9, 10, 7,
3, 32, :   object 'stationfile' not found

names(stations)= c("ID", "LAT", "LONG", "ELEV", "STATE", "NAME", "GSN", "HCN_CRN", "WHOID")

## Error in names(stations) = c("ID", "LAT", "LONG", "ELEV", "STATE",
"NAME", :   object 'stations' not found

head(stations)

## Error in head(stations):   object 'stations' not found

str(stations)

## Error in str(stations):   object 'stations' not found
```

Example of data:
AG000060680 22.8000 5.4331 1362.0 TAMANRASSET GSN 60680
subsectionSelecting and Example Location
Here's what the data look like:
ID 1-11 Character YEAR 12-15 Integer MONTH 16-17 Integer ELEMENT
18-21 Character VALUE1 22-26 Integer MFLAG1 27-27 Character QFLAG1 28-
28 Character SFLAG1 29-29 Character VALUE2 30-34 Integer MFLAG2 35-35
Character QFLAG2 36-36 Character SFLAG2 37-37 Character . . . . . . . . .
. VALUE31 262-266 Integer MFLAG31 267-267 Character QFLAG31 268-268
Character SFLAG31 269-269 Character

Arizona, let's chech import process for the sites...

```
stations[stations$ID=="US1AZMR0013",]

## Error in eval(expr, envir, enclos): object 'stations' not found

# head(stations[stations£HCN_CRN==" CRN",])
```

Let's get the arizona data into R

```
file = "C:\\workspace\\GitHub\\RTricks\\Climate_Change_Narratives\\Data\\ghcnd-stations.txt"
```

```
# practicing loops
for (year in c(2010,2011,2012,2013,2014,2015)){
  print(paste("The year is", year))
}

## [1] "The year is 2010"
## [1] "The year is 2011"
## [1] "The year is 2012"
## [1] "The year is 2013"
## [1] "The year is 2014"
## [1] "The year is 2015"

# Create New Varible Names
MFLAG=NA; QFLAG=NA; SFLAG=NA; VALUE=NA
for (i in 1:31){
VALUE[i] = paste("DATE", i, sep="")
MFLAG[i] = paste("MFLAG", i, sep="")
QFLAG[i] = paste("QFLAG", i, sep="")
SFLAG[i] = paste("SFLAG", i, sep="")
}

print(QFLAG)

##  [1] "QFLAG1"  "QFLAG2"  "QFLAG3"  "QFLAG4"  "QFLAG5"  "QFLAG6"  "QFLAG7"
##  [8] "QFLAG8"  "QFLAG9"  "QFLAG10" "QFLAG11" "QFLAG12" "QFLAG13" "QFLAG14"
## [15] "QFLAG15" "QFLAG16" "QFLAG17" "QFLAG18" "QFLAG19" "QFLAG20" "QFLAG21"
## [22] "QFLAG22" "QFLAG23" "QFLAG24" "QFLAG25" "QFLAG26" "QFLAG27" "QFLAG28"
## [29] "QFLAG29" "QFLAG30" "QFLAG31"

# Vector of variable names converted from a transposed matrix
tmp = as.vector(t(matrix(data=c(VALUE, MFLAG, QFLAG, SFLAG), ncol=4)))
Names = c("ID", "YEAR", "MONTH", "ELEMENT", tmp); length(Names)

## [1] 128
```

```r
# Read the file
test = read.fwf(file,widths = c(11, 4, 2, 4, rep(c(5, 1, 1, 1),31)))
```

```
## Warning in file(file, "rt"):  cannot open file 'C:\workspace\GitHub\RTricks\Climate_Chang
No such file or directory
## Error in file(file, "rt"):  cannot open the connection
```

```r
str(test)
```

```
## Error in str(test):  object 'test' not found
```

```r
names(test)= Names; test
```

```
## Error in names(test) = Names:  object 'test' not found
## Error in eval(expr, envir, enclos):  object 'test' not found
```

```r
head(test)
```

```
## Error in head(test):  object 'test' not found
```

setwd("C:
workspace
GitHub
RTricks
$300_G lobal_W arming$
$ghcnd_all$")

temp = list.files(pattern="*.dly"); head(temp) for (i in 1:length(temp)) for (i in 1:2) tmp <- read.fwf(temp[i], widths = c(11, 4, 2, 4, rep(c(5, 1, 1, 1),31))) names(tmp) <- Names assign(temp[i], subset(tmp, ELEMENT=="TMAX", select=c(1:4, seq(5, by = 4, length.out=31))))

library(tidyr) library(dplyr) library(stringr) str(AGM00060515.dly) gather(AGM00060515.dly, "Temp", VALUE1)

library(reshape) tmp1 = melt(AGM00060515.dly, id=c("ID", "YEAR", "MONTH", "ELEMENT")) head(tmp1) $tmp1 Day = as.numeric(str_s ub(tmp1$ variable,6,7))$; head(tmp1) $tmp1 value[tmp1$ value==-9999] = NA; head(tmp1) $tmp1 Temperature = tmp1$ value/10

drops <- c("variable","value") tmp1[ , !(names(tmp1) $tmp1 DECADE = round(tmp1$ YEAR, -1)

test1 = aggregate(Temperature DECADE, tmp1, sd) test2 = aggregate(Temperature DECADE, tmp1, mean) head(test2) names(test2[,2]) = "Mean"

$test2 Range = test1$ Mean + $test2 Temperature$

plot($test2 DECADE, test2$ Mean)

points($test1 DECADE, test1$ Temperature)

$full_j oin(test1, test2, by = list("MONTH", "DECADE"))$

New NOAA Directory – ftp://ftp.ncdc.noaa.gov/pub/data/noaa/

library(raster) library(XML)

coords.fwt <- read.fwf("ftp://ftp.ncdc.noaa.gov/pub/data/noaa/isd-history.txt",widths=c(6,1,5,1,38,7,1,8,9.

$Names = c("USAF", "X1", "WBAN", "X2", "STATION_N AME", "X3", "CTRY", "X4", "ST", "X5", "CALL$

$c(6, 1, 5, 1, 29, 1, 2, 3, 2, 1, 4, 1, 8, 1, 8, 1, 7, 1, 8, 1, 8)$

coords.fwt ¡- read.fwf("ftp://ftp.ncdc.noaa.gov/pub/data/noaa/isd-history.txt",widths=Widths,sep=";",sk

names(coords.fwt)=Names; coords.fwt[c(30,4000,20000),]

coords ¡- data.frame(ID=paste(as.factor(coords.fwt[,1])),WBAN=paste(as.factor(coords.fwt[,3])),Lat=as.nu

$as.numeric(paste(coords.fwt LON)))$; coords[c(30,4000,20000),]

plot()