

Is the global temperature increasing?

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1 Introduction

According to 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?

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?

2.3 Compressed Files

```
ftpsource = ftp://ftp.ncdc.noaa.gov/pub/data/ghcn/v3/ghcnm.tmax.latest.qca.tar.gz
untar(tarfile, files = NULL, list = FALSE, exdir = ".", compressed = NA, ex-
tras = NULL, verbose = FALSE, restoretimes = TRUE, tar = Sys.getenv("TAR"))
```

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

tarfile = "C:\\workspace\\GitHub\\RTricks\\300_Global_Warming\\Raw Data\\ghcnm.tmax.latest.q
untar(tarfile)
```

```
## Warning in gzfile(path.expand(tarfile), "rb"): cannot open compressed
file 'C:\workspace\GitHub\RTricks\300_Global_Warming\Raw Data\ghcnm.tmax.latest.qca.tar.gz',
probable reason 'No such file or directory'
## Error in gzfile(path.expand(tarfile), "rb"): cannot open the connection
```

```
read.table(stationfile, header=F, fill=T, row.names=NULL); head(stations)
read.fwf(file, widths, header = FALSE, sep = "^", skip = 0, row.names,
col.names, n = -1, buffersize = 2000, fileEncoding = "", ...)
AG000060680 22.8000 5.4331 1362.0 TAMANRASSET GSN 60680
stations = (read.fwf(stationfile, fill=T, widths= c(11, 9, 10, 7, 3, 32, 3, 4, 9),
)) names(stations)= c("ID", "LAT", "LONG", "ELEV", "STATE", "NAME",
"GSN", "HCNCRN", "WHOID")head(stations)str(stations)stations[stationsID=="US1AZMR0013",]
head(stations[stationsHCNCRN == "CRN",])
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
for (year in c(2010,2011,2012,2013,2014,2015)) print(paste("The year is",
year))
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="") QFLAG
tmp = as.vector(t(matrix(data=c(VALUE, MFLAG, QFLAG, SFLAG), ncol=4)))
Names = c("ID", "YEAR", "MONTH", "ELEMENT", tmp); length(Names)
test = read.fwf(file,widths = c(11, 4, 2, 4, rep(c(5, 1, 1, 1),31))) str(test)
names(test)= Names; test
head(test)
tmp = list.files(pattern="*.dly"); head(tmp) for (i in 1:length(tmp)) for
(i in 1:2) tmp[i] = read.fwf(tmp[i], widths = c(11, 4, 2, 4, rep(c(5, 1, 1, 1),31)))
names(tmp) i- Names assign(tmp[i], subset(tmp, ELEMENT=="TMAX", se-
lect=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) tmp1Day = as.numeric(str_sub(tmp1variable,6,7));
head(tmp1) tmp1value[tmp1value== -9999] = NA; head(tmp1) tmp1Temperature =
tmp1value/10
drops i- c("variable","value") tmp1[ , !(names(tmp1) tmp1DECADE =
round(tmp1YEAR, -1)
test1 = aggregate(Temperature DECADE, tmp1, sd) test2 = aggregate(Temperature
DECADE, tmp1, mean) head(test2) names(test2[,2]) = "Mean"
test2Range = test1Mean + test2Temperature
plot(test2DECADE, test2Mean)
```

```

points(test1DECADE, test1Temperature)
full_join(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_NAME", "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.fwtLON))); coords[c(30,4000,20000),]
plot()

```