IMT573 Lab 2: Make plots (and manipulate data)

Your name:

Deadline: Thu, Oct 15th 5pm

Instructions

1. Ensure your result is readable!
2. Ensure the code chunks are visible!
3. Explain what do you see in the results!
4. Upload both .html and .rmd!

This lab asks you to work with satellite-based global temperature records. There is quite a bit of debate how do satellite records relate to the actual near-ground temperature, here we simply assume that we talk about "lower troposphere temperature" here. You can download the original data from University of Alabama, Huntsville http://vortex.nsstc.uah.edu/data/msu/v6.0/tlt/uahncdc_lt_6.0.txt.

The variables are:

Year

Mo month 1..12

type the area of measurement: Globe, NH = north hemisphere, SH = south hemisphere, Trpcs = tropics, NoExt = northern areas outside tropics, SoExt, NoPol = northern polar areas, etc. There are separate figures for land and sea

temp Temperature, deg C deviation from 1981-2010 average.

1 Create a time variable

Here we ask you to make time series plots. For this you need time in as a continuous measure but this dataset provides two variables: years and months measured in single units, e.g. just years (or days/seconds/months...)

1. Load the data *UAH-lower-troposphere.csv.bz2*. Ensure you loaded it correctly.

   Hint: check its number of rows, columns, and print a few lines of it.

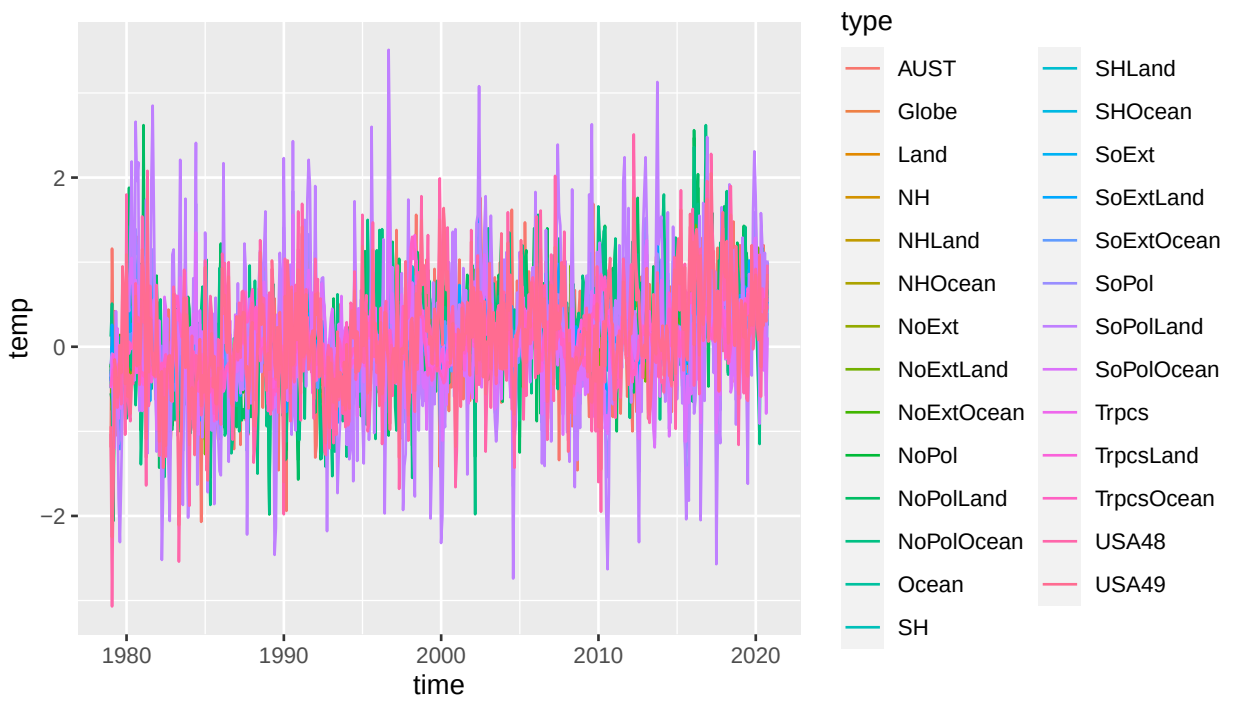
2. Compute a continuous time measure, e.g. $years + months/12$.

   Hint: use dplyr and `mutate` function.

2 Plot

Now let's do some plotting. First, and example: we plot a line for every area type in the data, each with a distinct color:

```
temp %>%
   ggplot(aes(time, temp, col=type)) +
                            # 'time' is the continous date variable we created above
   geom_line()
```



The result is a mess... Next, your task is to make something better out of it!

1. Make a plot of global temperature over time. But use only the all earth (type = *Globe*). Make the line blue.

   Hint: use filter to extract the correct type.

2. Plot only north hemisphere (NH) and south hemisphere (SH) temperature over time. Make these two lines of different color

   Hint2: map *col* aesthetic to the type variable!

3. Plot only yearly global average temperature (Globe). This time use barplot, color bars according to the temperature.

   Hint: use `filter` to extract global temperature.

   Hint2: Use `group_by` to compute yearly averages.

   Hint3: Use *geom_ bar(stat="identity")* geom

   Suggestion: add `scale_fill_gradientn(colors=c("blue", "white", "red"))` to make blues to represent cold and reds hot years!

4. Finally, make a different plot of your own choice! Feel free to experiment with other geoms and other tools!

3 Challenge (not graded)

If the previous tasks were too easy, consider a barplot not by years, but of average temperature by decades. Color it in a similar gradient fashion.