

Plot grid of plots in R.

Learning Objectives

After completing this tutorial, you will be able to:

- Add a variable to the markdown chunk in your .Rmd report.

What you need

You will need a computer with internet access to complete this lesson and the data for week 6/7 of the course.

Download Week 6/7 Data (~500 MB){:data-proofer-ignore=" .btn }

```
# load libraries
library(raster)
library(rgeos)
library(rgdal)

# import landsat data
all_landsat_bands <- list.files("data/week6/Landsat/LC80340322016189-SC20170128091153/crop",
                                pattern=glob2rx("*band*.tif$"),
                                full.names = T) # use the dollar sign at the end to get all files that END WITH

all_landsat_bands_st <- stack(all_landsat_bands)
```

Creating a grid of plots

You can plot several plots together in the same window using baseplot. To do this, we use the parameter value `mfrow=c(x,y)` where `x` is the number of rows that you wish to have in your plot and `y` is the number of columns. When you plot, R will place each plot, in order by row within the grid that you define using `mfrow`.

Below, we have created a 2 by 2 grid of plots using `mfrow=c(2,2)` within the `par()` function.

```
# adjust the parameters so the axes colors are white. Also turn off tick marks.
par(mfrow=c(2,2), col.axis="white", col.lab="white", tck=0)

# plot 1
plotRGB(all_landsat_bands_st,
        r=4,b=3,g=2,
        stretch="hist",
        main="Plot 1 - RGB",
        axes=T)
box(col="white") # turn all of the lines to white

# plot 2
plotRGB(all_landsat_bands_st,
        r=5,b=3,g=2,
        stretch="hist",
        main="Plot 2 - CIR",
        axes=T)
box(col="white") # turn all of the lines to white

# plot 3
```

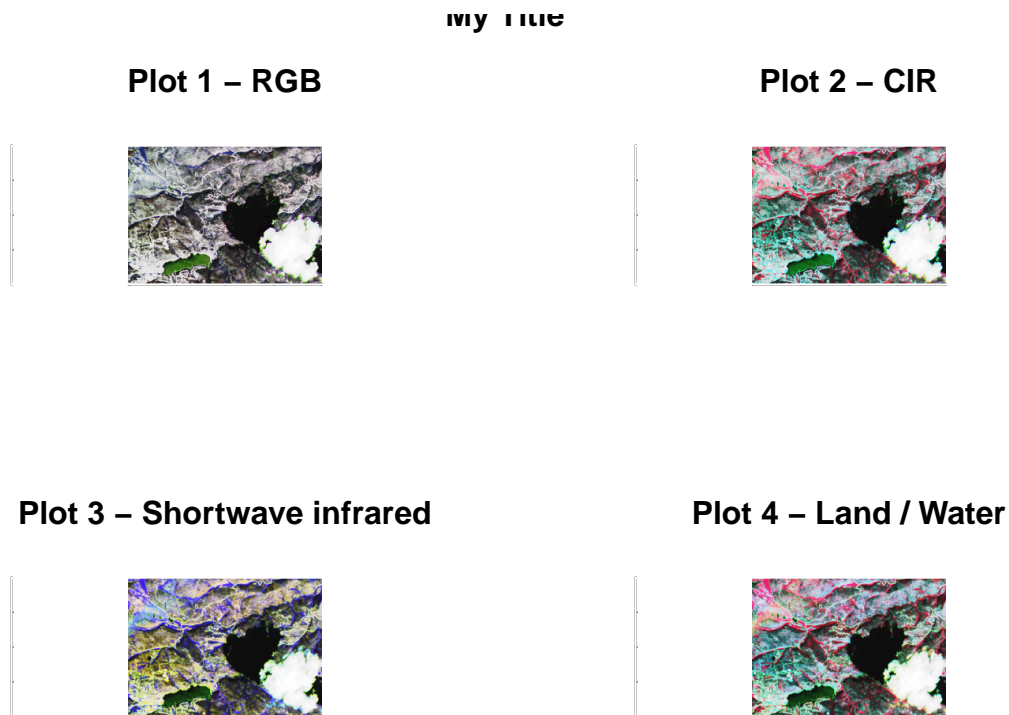


Figure 1: Create 2 x 2 grid of plots.

```
plotRGB(all Landsat bands_st,
        r=7,b=5,g=4,
        stretch="hist",
        main="Plot 3 - Shortwave infrared",
        axes=T)
box(col="white") # turn all of the lines to white

# plot 4
plotRGB(all Landsat bands_st,
        r=5,b=6,g=4,
        stretch="hist",
        main="Plot 4 - Land / Water",
        axes=T)
# set bounding box to white as well
box(col="white") # turn all of the lines to white

# add overall title to your layout
title("My Title", outer=TRUE)
```

Above, we added an overall title to our grid of plots using the `title()` function. However the title is chopped off because there is not enough of a margin at the top for it. We can adjust for this too using the

`oma=` argument in our `par()` function. Let's try it.

```
# adjust the parameters so the axes colors are white. Also turn off tick marks.
par(mfrow=c(2,2), oma=c(0,0,2,0), col.axis="white", col.lab="white", tck=0)
# plot 1
```

```

plotRGB(all Landsat bands_st,
        r=4,b=3,g=2,
        stretch="hist",
        main="Plot 1 - RGB",
        axes=T)
box(col="white") # turn all of the lines to white

# plot 2
plotRGB(all Landsat bands_st,
        r=5,b=3,g=2,
        stretch="hist",
        main="Plot 2 - CIR",
        axes=T)
box(col="white") # turn all of the lines to white

# plot 3
plotRGB(all Landsat bands_st,
        r=7,b=5,g=4,
        stretch="hist",
        main="Plot 3 - Shortwave infrared",
        axes=T)
box(col="white") # turn all of the lines to white

# plot 4
plotRGB(all Landsat bands_st,
        r=5,b=6,g=4,
        stretch="hist",
        main="Plot 4 - Land / Water",
        axes=T)
# set bounding box to white as well
box(col="white") # turn all of the lines to white

# add overall title to your layout
title("My Title", outer=TRUE)

```

When you are done with plotting in a grid space, be sure to reset your plot space using `dev.off()`.

```
dev.off()
```

Your homework this week should look something like this

```

# NAIP
# Use stack function to read in all bands
naip_stack_csf <-
  stack("data/week6/naip/m_3910505_nw_13_1_20130926/crop/m_3910505_nw_13_1_20130926_crop.tif")

# transform the boundary
fire_boundary_utm <- spTransform(fire_boundary,
                                CRS=crs(naip_stack_csf))

par(mfrow=c(3,1))

# adjust the parameters so the axes colors are white. Also turn off tick marks.
par(col.axis="white", col.lab="white", tck=0)
plotRGB(naip_stack_csf, 4,3,2,

```

My Title

Plot 1 – RGB



Plot 2 – CIR



Plot 3 – Shortwave infrared



Plot 4 – Land / Water



Figure 2: Remove axes labels.

```
main="NAIP CIR image \n Cold Springs Site",
ext=extent(fire_boundary_utm),
axes=T)
plot(fire_boundary_utm, add=T)
box(col="white") # turn all of the lines to white
# add fire boundary

all_landsat_bands <- list.files("data/week6/Landsat/LC80340322016205-SC20170127160728/crop",
                                pattern=glob2rx("*band*.tif$"),
                                full.names = T) # use the dollar sign at the end to get all files that END WITH
all_landsat_bands_st <- stack(all_landsat_bands)

par(col.axis="white", col.lab="white", tck=0)
plotRGB(all_landsat_bands_st, 5,4,3,
        stretch="hist",
        main="landsat CIR image",
        ext=extent(fire_boundary_utm),
        axes=T)
box(col="white")
# add fire boundary
plot(fire_boundary_utm, add=T)

# modis cir imagery
# open modis bands
all_modis_bands <-list.files("data/week6/modis/reflectance/17_july_2016/crop",
```

```

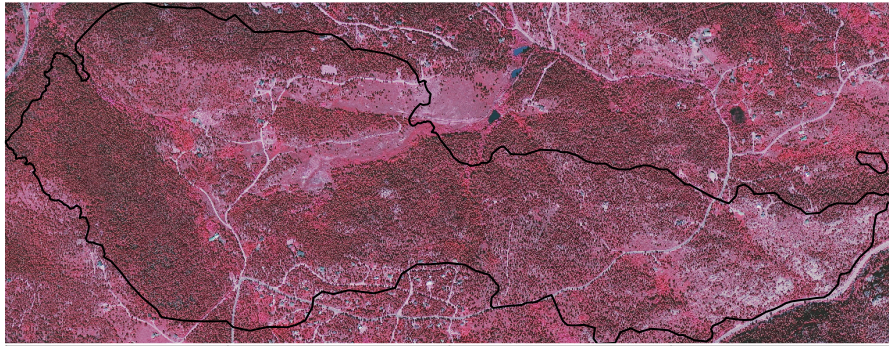
        pattern=glob2rx("*sur_refl*.tif$"),
        full.names = T)

all_modis_bands_st <- stack(all_modis_bands)
# transform the boundary
fire_boundary_sin <- spTransform(fire_boundary,
                                CRS=crs(all_modis_bands_st))

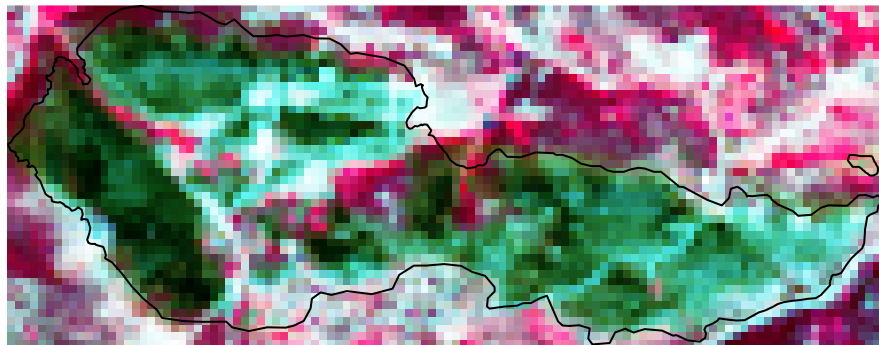
## 3 = blue, 4 = green, 1= red 2= nir
par(col.axis="white", col.lab="white", tck=0)
plotRGB(all_modis_bands_st,
        r=2, g =4, b=3,
        stretch="lin",
        main="MODIS CIR imagery",
        ext=extent(fire_boundary_sin),
        axes=T)
box(col="white")
plot(fire_boundary_sin, add=T)

```

**NAIP CIR image
Cold Springs Site**



landsat CIR image



MODIS CIR imagery



Figure 3: