

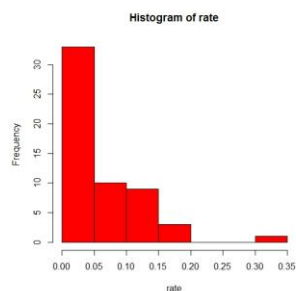
Spatial Analysis Techniques in R

Mid Week Bit of Fun (3)

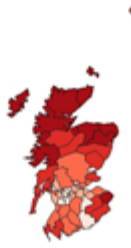
Publication Quality Choropleth Maps

The choropleth maps produced in `sp` using the supplied defaults are essentially 'naked', lacking a key, proper title, north arrow, scale bar and so on. They might be fine for simple exploratory analysis, but for publication something more sophisticated may well be needed. There are several ways by which this can be done. You can fiddle with arguments in the `spplot` method, use `ggplot2`, or any of a number of packages designed specifically for this purpose. The package I like to use is *GISTools*, contributed by *statistics.com* instructor Dr. Chris Brunsdon. For this week's bit of fun you might like to try it out. A simple sequence illustrates its use:

```
> #load the libraries
> #maptools for the shapefile
> #sp for the spdf
> #GISTools for the cartography
> library(maptools)
> library(sp)
> library(GISTools)
> # read in the shapefile
> lips<-readShapePoly("C:\\Users\\David\\Desktop\\scotlip\\scotlip",
IDvar="RECORD_ID",proj4string=CRS(as.character(NA)))
> #compute the rate per thousand, check it and bind back into the spdf
> rate<-(lips$CANCER/lips$POP)*1000
> rate
[1] 0.317751730 0.168585224 0.132227431 0.174047573 0.116035306 0.150378767
[7] 0.105900706 0.111815728 0.101380464 0.120806504 0.148038490 0.133258708
[13] 0.102131136 0.092545463 0.091658040 0.080598218 0.073868883 0.074353391
[19] 0.055259813 0.068161680 0.060789119 0.053143434 0.057647157 0.042730347
[25] 0.043968047 0.039583476 0.042760365 0.043255402 0.046237296 0.028742991
[31] 0.035932963 0.045837917 0.028037346 0.034316354 0.034448634 0.030380977
[37] 0.028096130 0.025072711 0.025948527 0.025490046 0.016196614 0.018756492
[43] 0.014154883 0.013356158 0.014756582 0.012596045 0.008102119 0.009612211
[49] 0.012087968 0.010968601 0.005580544 0.009032852 0.006844065 0.004052783
[55] 0.000000000 0.000000000
> hist(rate, col="red")
```



```
> lips<-spCbind(lips,rate)
> choropleth(lips,lips$rate)
```



```
> #the basic default in GISTools gives a 'naked' map
> #and we want different cartography
> #define the required classing scheme and shades, 7 shades of green
> col_ramp<-auto.shading(lips$rate, n=7, cutter=rangeCuts, cols=brewer.pal(7,"Greens"))
> #plot this equally naked map
> choropleth(lips,lips$rate,col_ramp)
```



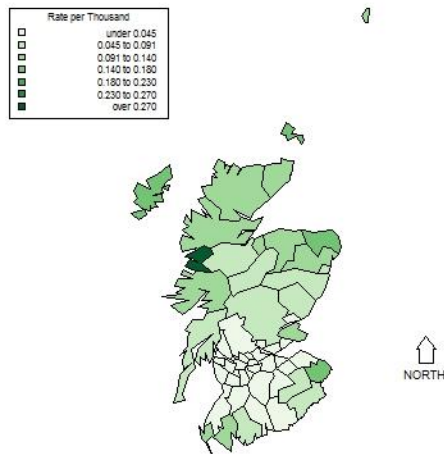
```
> #keep on screen .... and add a key
> #locate where we want to locate the key using the locator method
> #locator method returns the (x,y) position of the black cursor cross
> locator(1)
$x
[1] -90137.8

$y
[1] 1204212

> #put a key somewhere near here, size scaled by cex and C style format for the
> #numbers, same col-ramp
> choro.legend(-90137,1204212,col_ramp,fmt="%5.3f",title="Rate per Thousand", cex=0.5)
> #add north arrow, which is more or less top of page on this projection
> locator(1)
$x
[1] 540851.3
$y
[1] 668065.2
> north.arrow(540851,668065,10000,cex=0.6)
> #note that the third argument is a size control, cex= 0.6 seems to work
> # finally title and exit
> title("Rate per thousand person-years, 1975-1980")
```

The resulting map now looks like:

Rate per thousand person-years, 1975-1980



I hope that, although I forgot to name the rate mapped (Cancer of the lip) you will agree that this is a big improvement on the default in the notes.

The locational co-ordinates

The spatial (x , y) co-ordinates are actually OSGB National Grid values using a transverse Mercator projection, and have a resolution to the nearest metre north and east of an arbitrary origin located to the south west of Great Britain. For locations on the land, all are positive numbers. The little trick using `locator(1)` means that we don't really need to know much about these numbers to position our bits of what cartographers call 'base detail'.