

# Clase Mapas básicas en R

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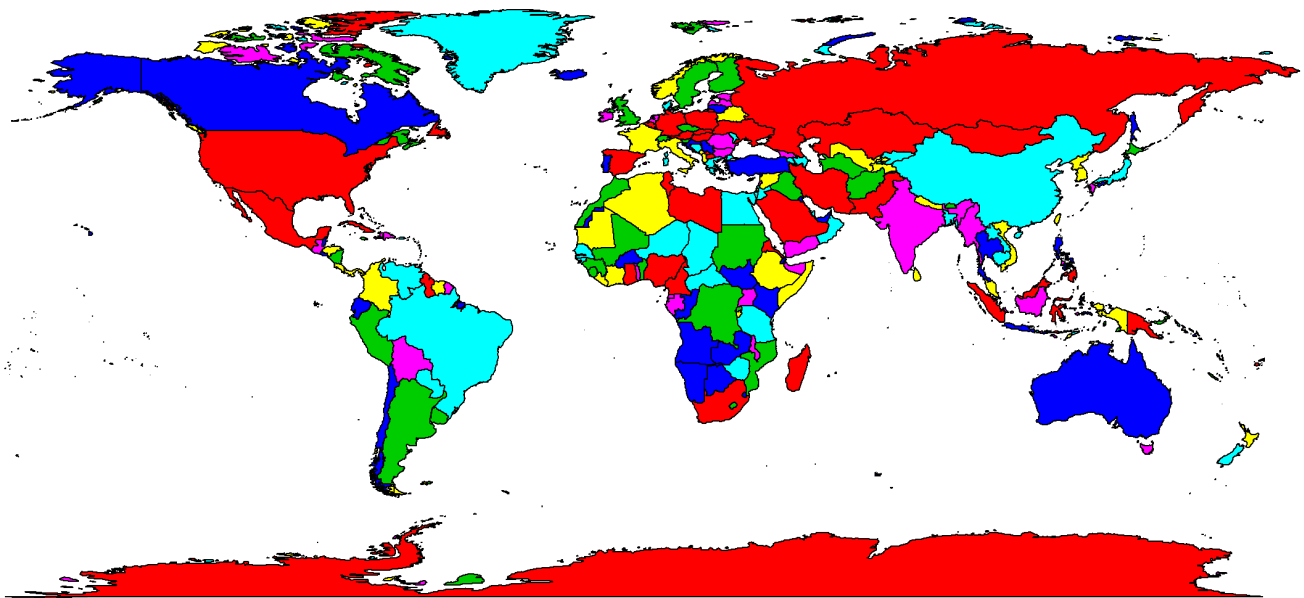
*15 de noviembre de 2016*

## Simple mapa del Mundo

```
library(maps)
```

```
## Warning: package 'maps' was built under R version 3.3.1
```

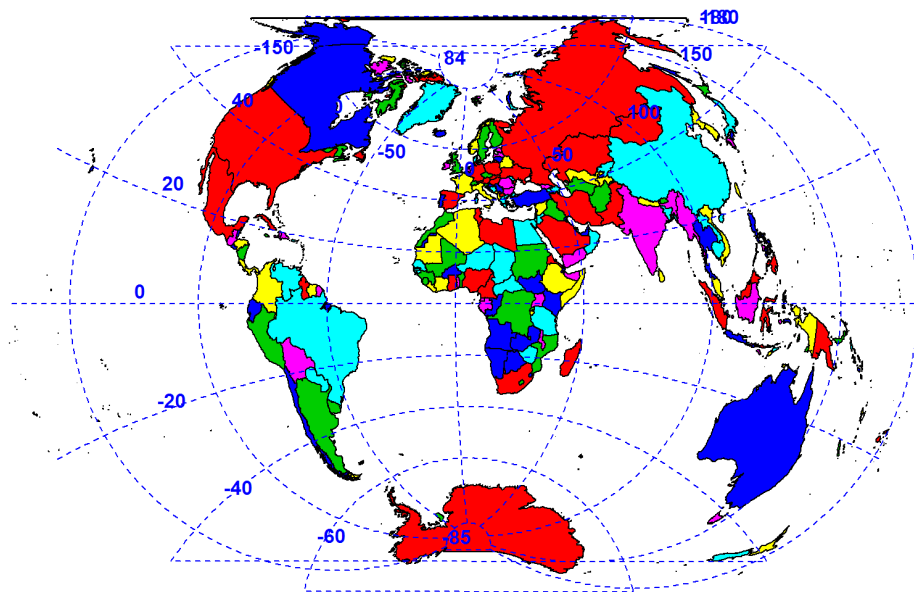
```
map('world', fill = TRUE, col = 2:7)
```



```
# otra proyección y líneas de cuadrantes  
library(mapproj)
```

```
## Warning: package 'mapproj' was built under R version 3.3.2
```

```
map('world', fill = TRUE, col = 2:7, projection = "globular")  
my_grid <- map('world', plot = FALSE)  
map.grid(my_grid)
```



## Mapa de México y Centroamérica

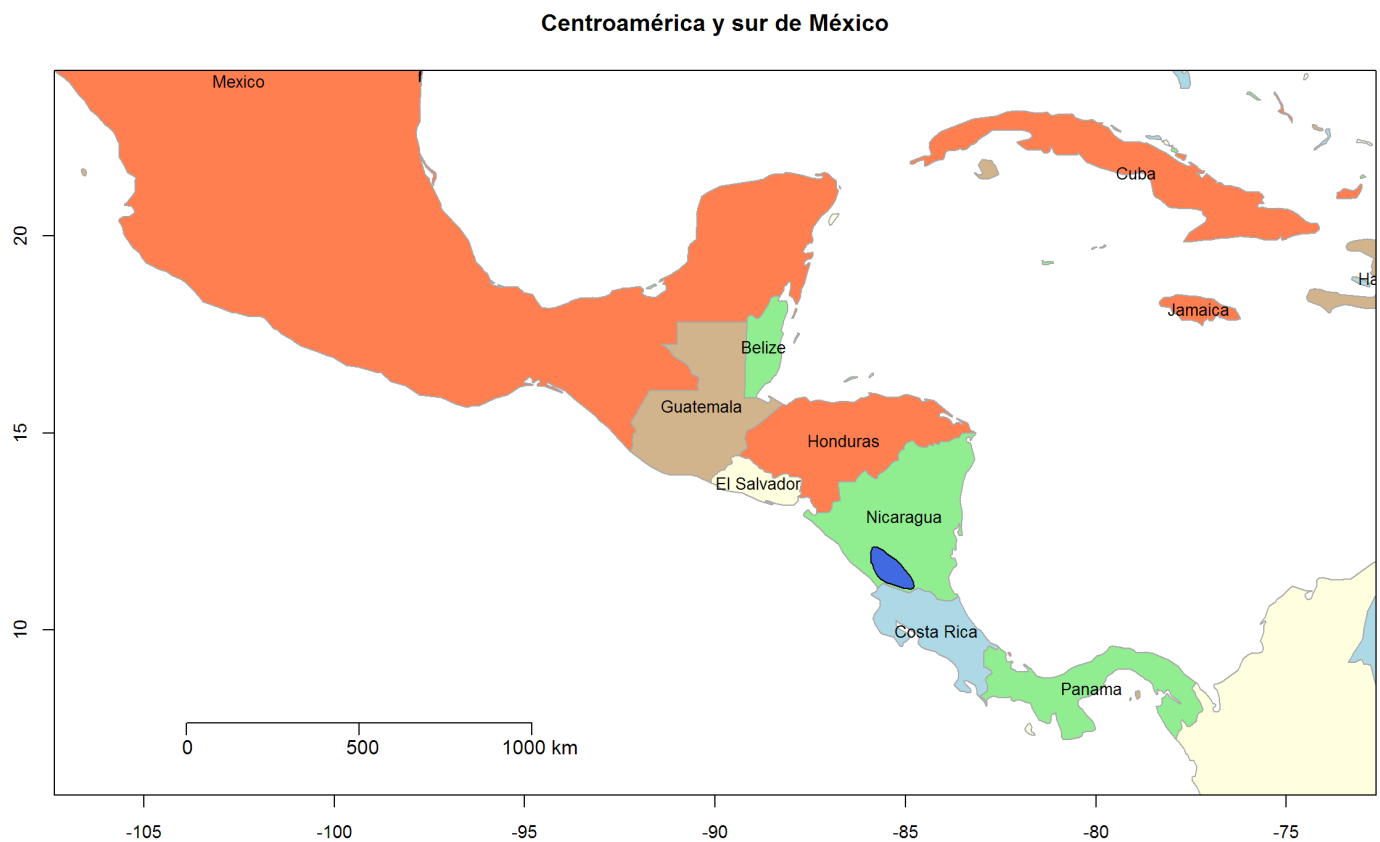
```
# definir limites
ext_vector <- c(-107.008472222,-72.9807502222,5.99152777778,24.0179697778)

# mapa principal
my_map <- map('world', border = "darkgray", fill = TRUE,
              col = c("coral","lightgreen","lightyellow","lightblue","tan"),
              xlim = ext_vector[1:2], ylim = ext_vector[3:4])

# titulo, ejes y escala
title("Centroamérica y sur de México")
map.axes(cex.axis = 0.9)
map.scale(ratio = FALSE)

# agregar capa de lagos
map('lakes', add=TRUE, fill=TRUE, col="royalblue", boundary="darkgray")

# agregar nombres de paises, pero omitir islas y otros fragmentos
my_names <- my_map$names
my_good_names <- my_names[!grepl(":+", my_names)]
map.text('world', regions = my_good_names, exact = TRUE,
         cex = 0.85, add = TRUE)
```



## Cargar los archivos shapefile y visualizarlos

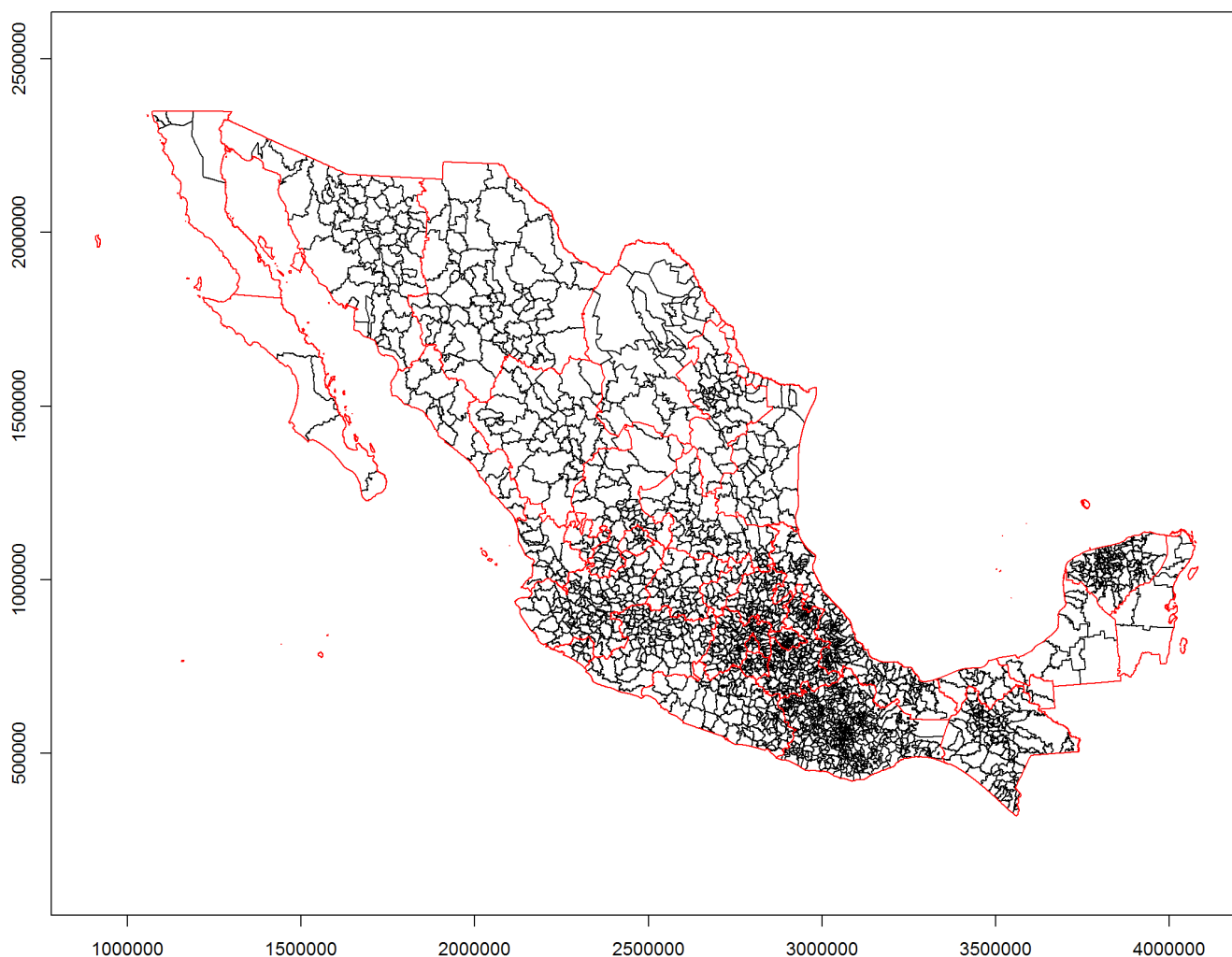
```
library(maptools)
```

```
## Warning: package 'maptools' was built under R version 3.3.1
```

```
## Loading required package: sp
```

```
## Checking rgeos availability: TRUE
```

```
municipios <- readShapePoly("datos/Municipios.shp")  
estados <- readShapePoly("datos/Estados.shp")  
plot(municipios, axes = TRUE)  
plot(estados, border = "red", add = TRUE)
```



## Cuadro en proyección LCC de INEGI

```
library(mapttools)
library(rgdal)
```

```
## rgdal: version: 1.1-10, (SVN revision 622)
## Geospatial Data Abstraction Library extensions to R successfully loaded
## Loaded GDAL runtime: GDAL 2.0.1, released 2015/09/15
## Path to GDAL shared files: C:/Program Files/R/R-libs-user/rgdal/gdal
## Loaded PROJ.4 runtime: Rel. 4.9.2, 08 September 2015, [PJ_VERSION: 492]
## Path to PROJ.4 shared files: C:/Program Files/R/R-libs-user/rgdal/proj
## Linking to sp version: 1.2-3
```

```
library(sp)
```

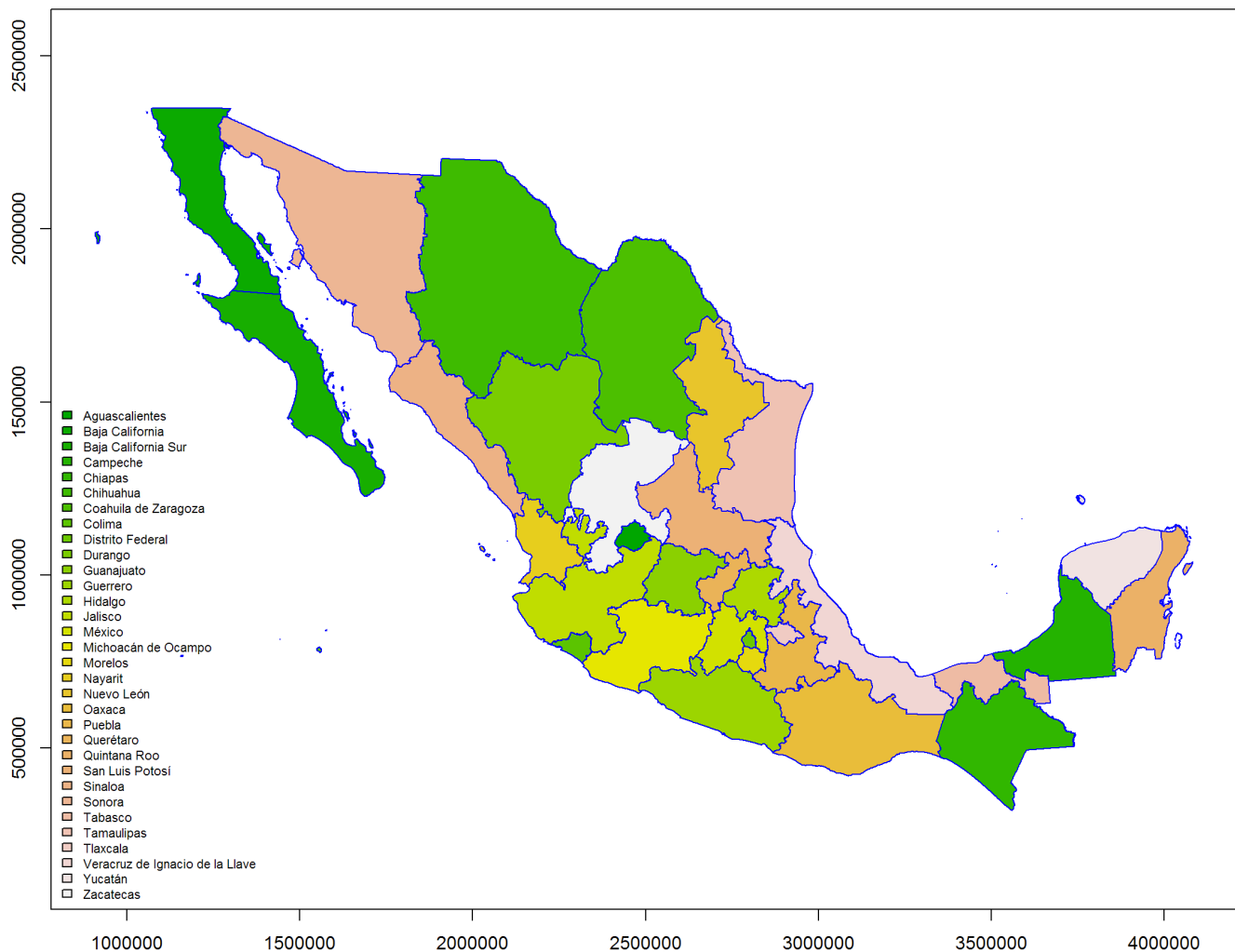
```
palette(terrain.colors(32))
```

```
mi_crs <- CRS("+proj=lcc +lat_1=17.5 +lat_2=29.5 +lat_0=12 +lon_0=-102 +x_0=2500000 +y_0=0 +datum=WGS84")
```

```
estados_lcc <- readShapePoly("datos/Estados.shp", proj4string = mi_crs)
```

```
plot(estados_lcc, axes = TRUE, border = "blue", col = estados_lcc$NOM_ENT)
```

```
legend("bottomleft", legend = levels(estados_lcc$NOM_ENT),  
      fill = palette(terrain.colors(32)), bty = "n", cex = 0.7)
```



```
levels(estados_lcc$NOM_ENT)
```

```
## [1] "Aguascalientes"      "Baja California"
## [3] "Baja California Sur"   "Campeche"
## [5] "Chiapas"               "Chihuahua"
## [7] "Coahuila de Zaragoza"  "Colima"
## [9] "Distrito Federal"      "Durango"
## [11] "Guanajuato"            "Guerrero"
## [13] "Hidalgo"               "Jalisco"
## [15] "México"                "Michoacán de Ocampo"
## [17] "Morelos"               "Nayarit"
## [19] "Nuevo León"            "Oaxaca"
## [21] "Puebla"                "Querétaro"
## [23] "Quintana Roo"          "San Luis Potosí"
## [25] "Sinaloa"               "Sonora"
## [27] "Tabasco"               "Tamaulipas"
## [29] "Tlaxcala"              "Veracruz de Ignacio de la Llave"
## [31] "Yucatán"               "Zacatecas"
```

## Cuadro reproyectado a coordenadas geográficas con puntos de Guadalajara y Ciudad de México

```
mi_crs2 <- CRS("+proj=longlat +datum=WGS84 +ellps=WGS84 +towgs84=0,0,0")
estados_geo <- spTransform(estados_lcc, mi_crs2)
```

```
lista_lat <- c(20.65,19.41)
lista_lon <- c(-103.35,-99.13)
puntos <- data.frame(lista_lon,lista_lat)
names(puntos) <- c("Longitud","Latitud")
```

```
puntos_sp <- SpatialPoints(puntos, proj4string = mi_crs2)
puntos_sp
```

```
## SpatialPoints:
##      Longitud Latitud
## [1,]  -103.35   20.65
## [2,]   -99.13   19.41
## Coordinate Reference System (CRS) arguments: +proj=longlat
## +datum=WGS84 +ellps=WGS84 +towgs84=0,0,0
```

```
plot(estados_geo, axes = TRUE, border = "blue", col = estados_geo$NOM_ENT)
points(puntos_sp$Longitud, puntos_sp$Latitud, pch = 19, col = "red", cex = 2)
legend("bottomleft", legend = levels(estados_geo$NOM_ENT),
      fill = palette(terrain.colors(32)), bty = "n", cex = 0.7)
```

