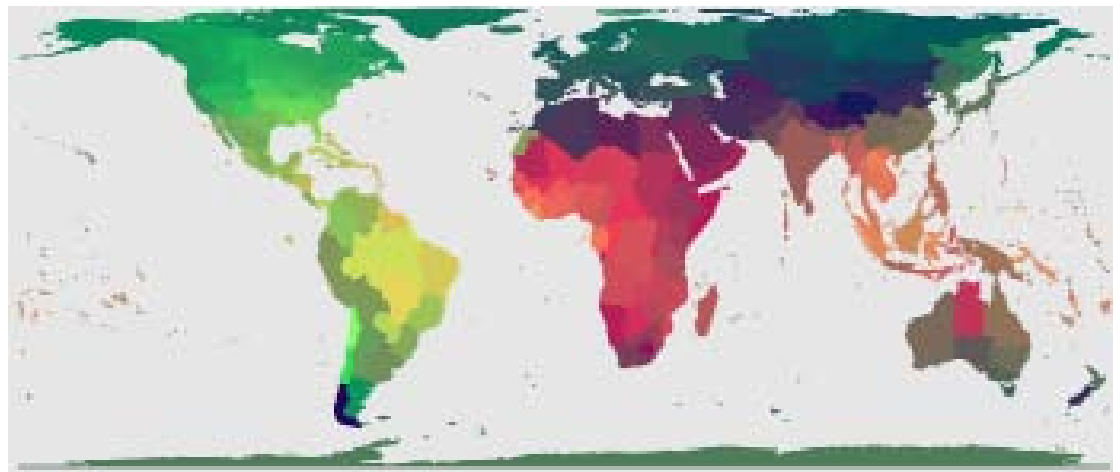
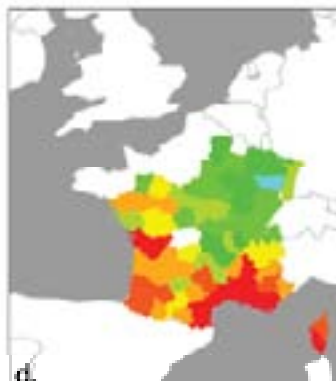
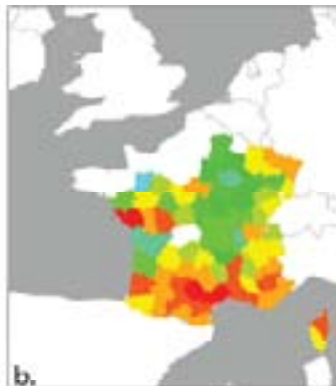


# Intro to Mapping in R



19 October 2015

# Why use R?

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- opensource
- continued development of packages
- myriad online help/resources
- can simply produce maps without external data (e.g., with maptools, raster libraries)

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## **Potential disadvantage:**

- Memory/speed limitations
  - \*in some cases you may want to either parallelize, or learn Python

# Useful R Packages for Mapping

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|                     |  |
|---------------------|--|
| <b>sp</b>           | classes and methods for spatial data                 |
| <b>spdep</b>        | spatial statistics and weighting                     |
| <b>maptools</b>     | tools for reading and handling spatial objects       |
| <b>maps</b>         | for creating geographical maps                       |
| <b>mapdata</b>      | contains basic data to go along with maps            |
| <b>mapproj</b>      | for creating projected maps                          |
| <b>raster</b>       | tools for dealing with raster objects - layers       |
| <b>rgeos</b>        | interface to geometry engine - open source (GEOS)    |
| <b>rgdal</b>        | bindings for the geospatial data abstraction library |
| <b>scales</b>       | for transparency in plotting                         |
| <b>plotrix</b>      | various plotting functions                           |
| <b>RColorBrewer</b> | generating color schemes for plotting                |
| <b>epitools</b>     | useful data and graphics manipulation                |
| <b>PBSmapping</b>   | general spatial analysis tools                       |
| <b>RgoogleMaps</b>  | using Google maps as backdrops for plotting in R     |

## Background: *Spatial* Classes in R

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Generally consists of 2 'slots':

1. Coordinates such as (x,y) or (long,lat)
2. Coordinate reference system (CRS) -  
can be left as NA

Common Spatial classes in R:

1. 'map'
2. 'SpatialPolygons'
3. 'SpatialLines'
4. 'SpatialPoints'
5. 'raster'

# Background: Map projection



No Projection



Behrmann

Equal Area Projection

# Background: Data Sources

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## **Climate**

CRU

WorldClim

BEST

Weather stations/FLUX towers

## **Distribution/Occurrence**

NA tree ranges - USGS

GBIF

## **Landcover**

MODIS

**Many others online....**

# Other resources

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## **Books:**

Applied Spatial Data Analysis with R, Springer  
R Graphics Book, O'Reilly

## **Online resources:**

<http://www.molularecologist.com/2012/09/making-maps-with-r/>  
<http://www.r-bloggers.com/interactive-maps-for-the-web-in-r/>  
<https://www.nceas.ucsb.edu/scicomp/usecases/CreateMapsWithR-Graphics>

## **Network Mapping:**

<http://flowingdata.com/2011/05/11/how-to-map-connections-with-great-circles/>  
<http://www.r-bloggers.com/network-visualization-part-2-gephi/>

## **Designing Color Palettes:**

<http://www.r-bloggers.com/color-palettes-in-r/>