Introducción a los SIG con R

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Cursos de Formación Nuevas Tecnologías 2018-2019

04-12-2018

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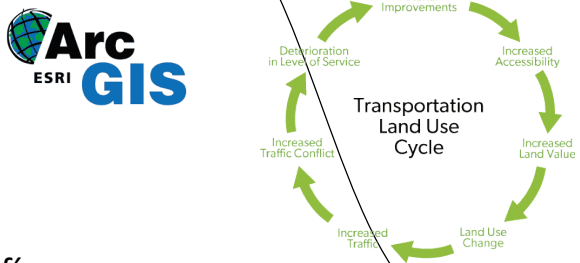
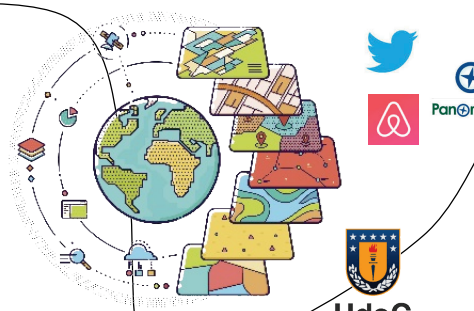
Ordenación del territorio e impacto de infraestructuras de transporte

Accesibilidad y movilidad en SIG

Licenciatura en Geografía



Doctorado transporte y usos del suelo



tGIS
transporte infraestructuras y territorio
Grupo de Investigación de la Universidad Complutense de Madrid

Sistemas de Información Geográfica

Cartografía

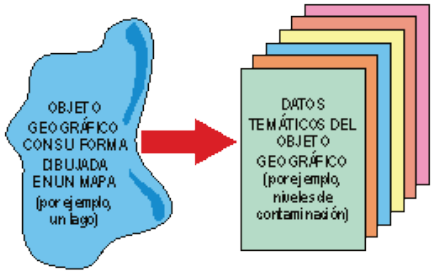
Usuario especializado

Herramientas

Hard & Software

Atributos

Datos geográficos



Sistema

Portada

Introducción. ¿Qué puedo hacer con un SIG?

En este capítulo se presentan algunas nociones básicas sobre análisis espacial y su significado. Con ellas, se podrá abordar posteriormente la presentación de formulaciones específicas de diversa índole, que serán las piezas fundamentales del estudio de datos espaciales dentro de un SIG.

Al acabar el capítulo se tendrá un concepto general de las distintas clases de operaciones analíticas que serán desarrolladas en esta parte del libro. Para estudiar este capítulo es necesario previamente conocer los diferentes tipos de datos que se manejan en un SIG, de cara a poder entender la disposición de estos a uno u otro tipo de análisis.

http://volaya.github.io/libro-sig/chapters/Introduccion_procesos.html

http://www.fsf.org/

- ✓ Software libre
- ✓ Cálculos estadísticos y gráficos
- ✓ Lenguaje R
- ✓ Documentación estandarizada

R is available as Free Software under the terms of the Free Software Foundation's GNU General Public License in source code form. It compiles and runs on a wide variety of UNIX platforms and similar systems (including FreeBSD and Linux), Windows and MacOS.
Licencia: https://www.r-project.org/COPYING

[Home]

Download

CRAN

R Project

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R Foundation

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Help With R

Getting Help

Documentation

Manuals
FAQs
The R Journal
Books
Certification
Other

Links

Bioconductor
Related Projects

The R Project for Statistical Computing

Getting Started

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To **download R** please choose your preferred CRAN mirror.

If you have questions about R like how to download and install the software, or what the license terms are, please read our answers to frequently asked questions before you send an email.

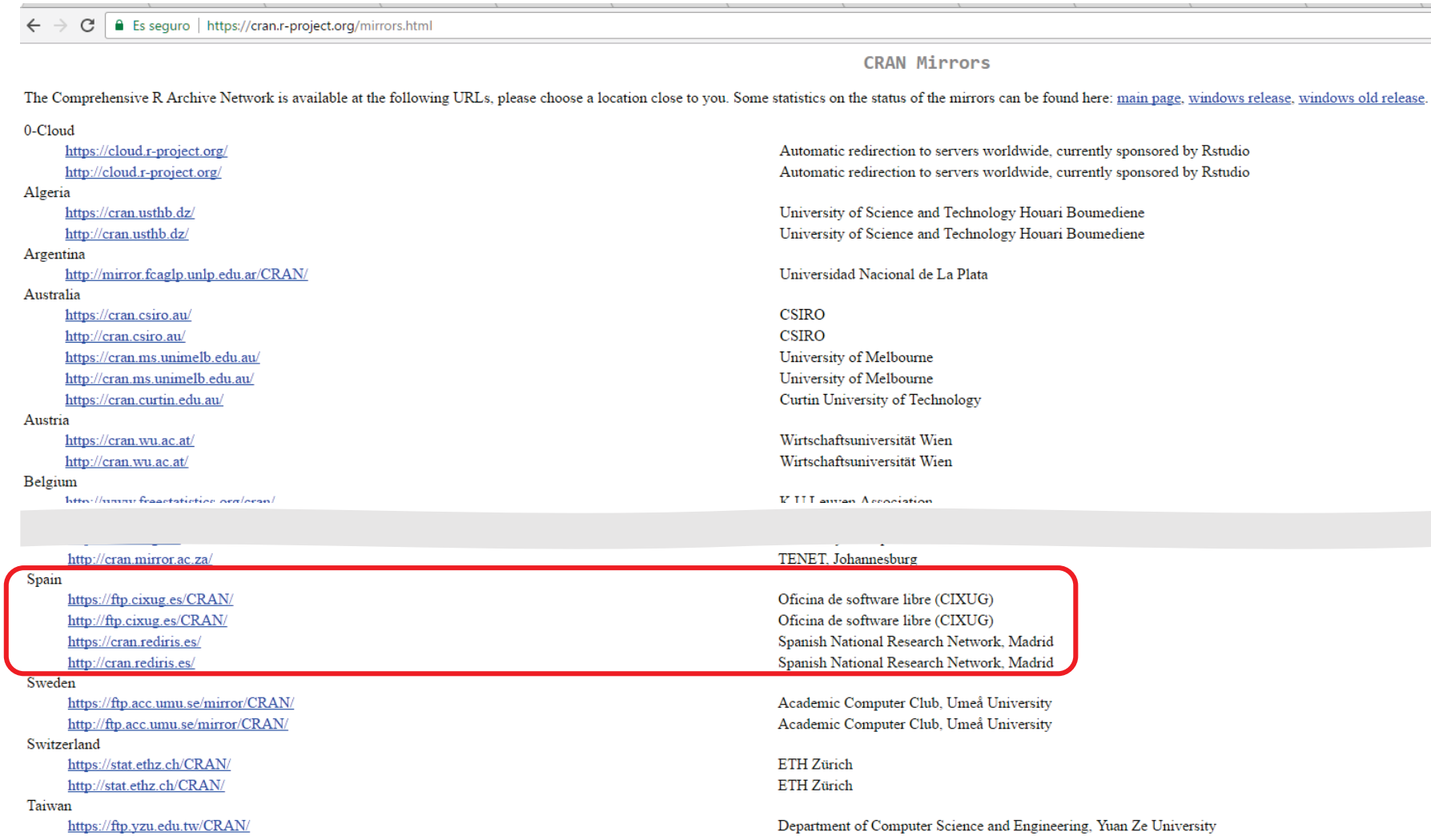
News

- **useR! 2017** (July 4 - 7 in Brussels) has opened registration and more at http://user2017.brussels/
- Tomas Kalibera has joined the R core team.
- The R Foundation welcomes five new ordinary members: Jennifer Bryan, Dianne Cook, Julie Josse, Tomas Kalibera, and Balasubramanian Narasimhan.
- **R version 3.3.2 (Sincere Pumpkin Patch)** has been released on Monday 2016-10-31.
- **The R Journal Volume 8/1** is available.
- The **useR! 2017** conference will take place in Brussels, July 4 - 7, 2017.
- **R version 3.3.1 (Bug in Your Hair)** has been released on Tuesday 2016-06-21.
- **R version 3.2.5 (Very, Very Secure Dishes)** has been released on 2016-04-14. This is a rebadging of the quick-fix release 3.2.4-revised.
- **Notice XQuartz users (Mac OS X)** A security issue has been detected with the Sparkle update mechanism used by XQuartz. Avoid updating over insecure channels.
- The **R Logo** is available for download in high-resolution PNG or SVG formats.
- **useR! 2016**, hase taken place at Stanford University, CA, USA, June 27 - June 30, 2016.
- **The R Journal Volume 7/2** is available.
- **R version 3.2.3 (Wooden Christmas-Tree)** has been released on 2015-12-10.
- **R version 3.1.3 (Smooth Sidewalk)** has been released on 2015-03-09.

https://www.r-project.org/

Descarga

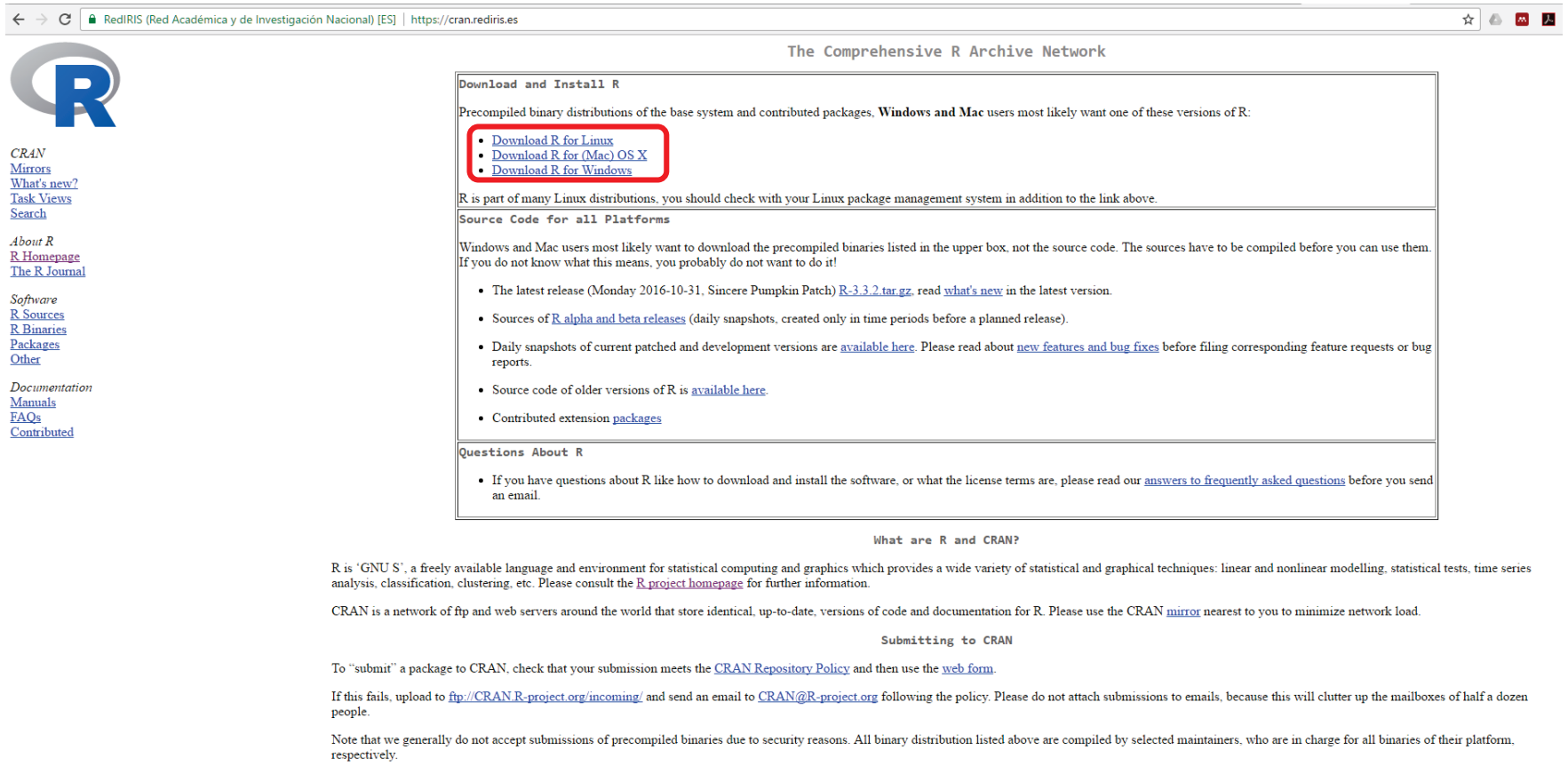
- ✓ *Descarga a través de CRAN (por países)*
- ✓ *CRAN = red de servidores ftp con idénticas versiones de R*
- ✓ *Usa el más cercano para minimizar el uso de la red*



https://cran.r-project.org/mirrors.html

Descarga

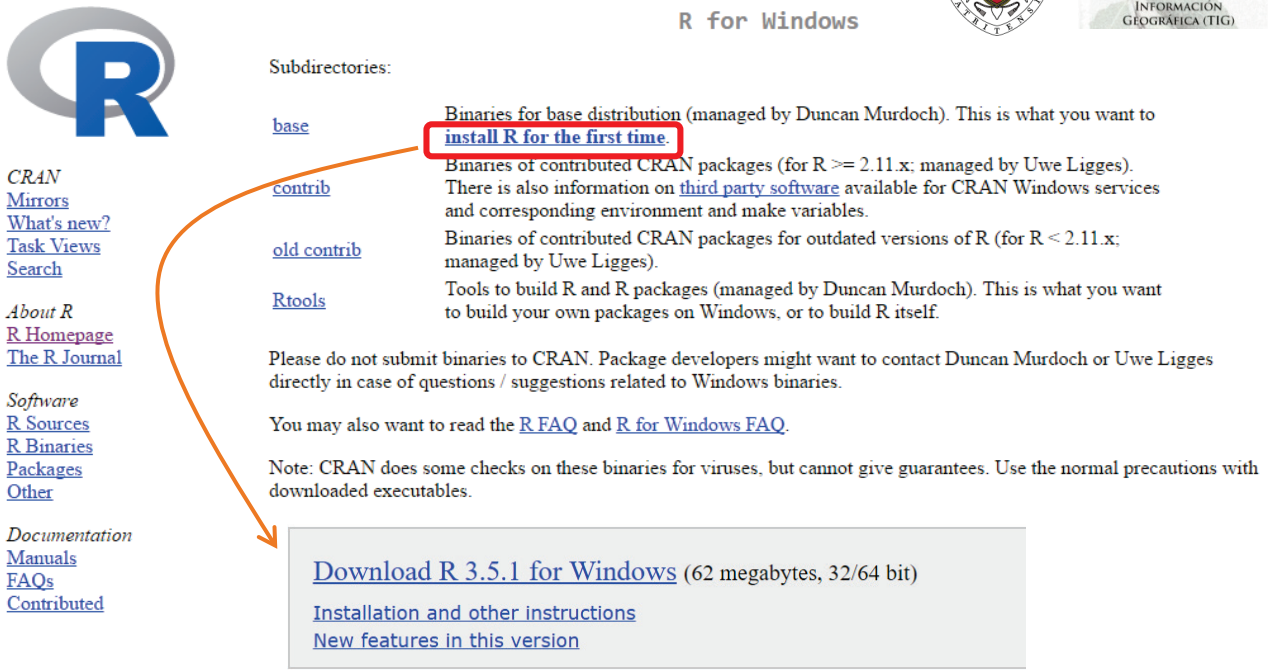
- ✓ Descarga (varios SO)
- ✓ Código fuente
- ✓ Preguntas frecuentes
- ✓ Envío de paquetes



https://cran.rediris.es/

Descarga

✓ *Descarga para instalar R por primera vez*



R for Windows

Subdirectories:

base	Binaries for base distribution (managed by Duncan Murdoch). This is what you want to **install R for the first time**.
contrib	Binaries of contributed CRAN packages (for R >= 2.11.x; managed by Uwe Ligges). There is also information on third party software available for CRAN Windows services and corresponding environment and make variables.
old contrib	Binaries of contributed CRAN packages for outdated versions of R (for R < 2.11.x; managed by Uwe Ligges).
Rtools	Tools to build R and R packages (managed by Duncan Murdoch). This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Duncan Murdoch or Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the R FAQ and R for Windows FAQ.

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.

Download R 3.5.1 for Windows (62 megabytes, 32/64 bit)

Installation and other instructions

New features in this version

CRAN
Mirrors
What's new?
Task Views
Search

About R
R Homepage
The R Journal

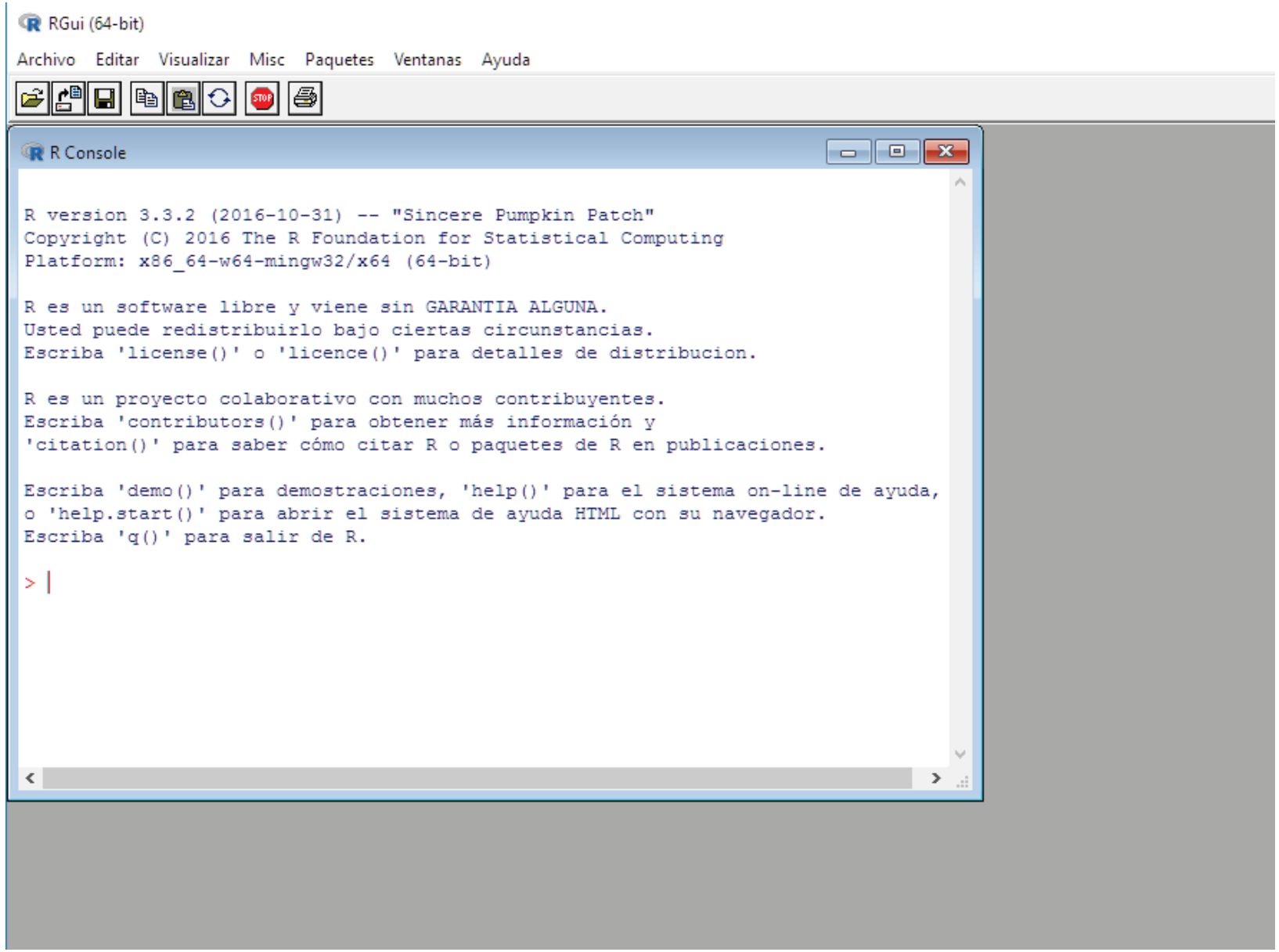
Software
R Sources
R Binaries
Packages
Other

Documentation
Manuals
FAQs
Contributed

https://cran.rediris.es/

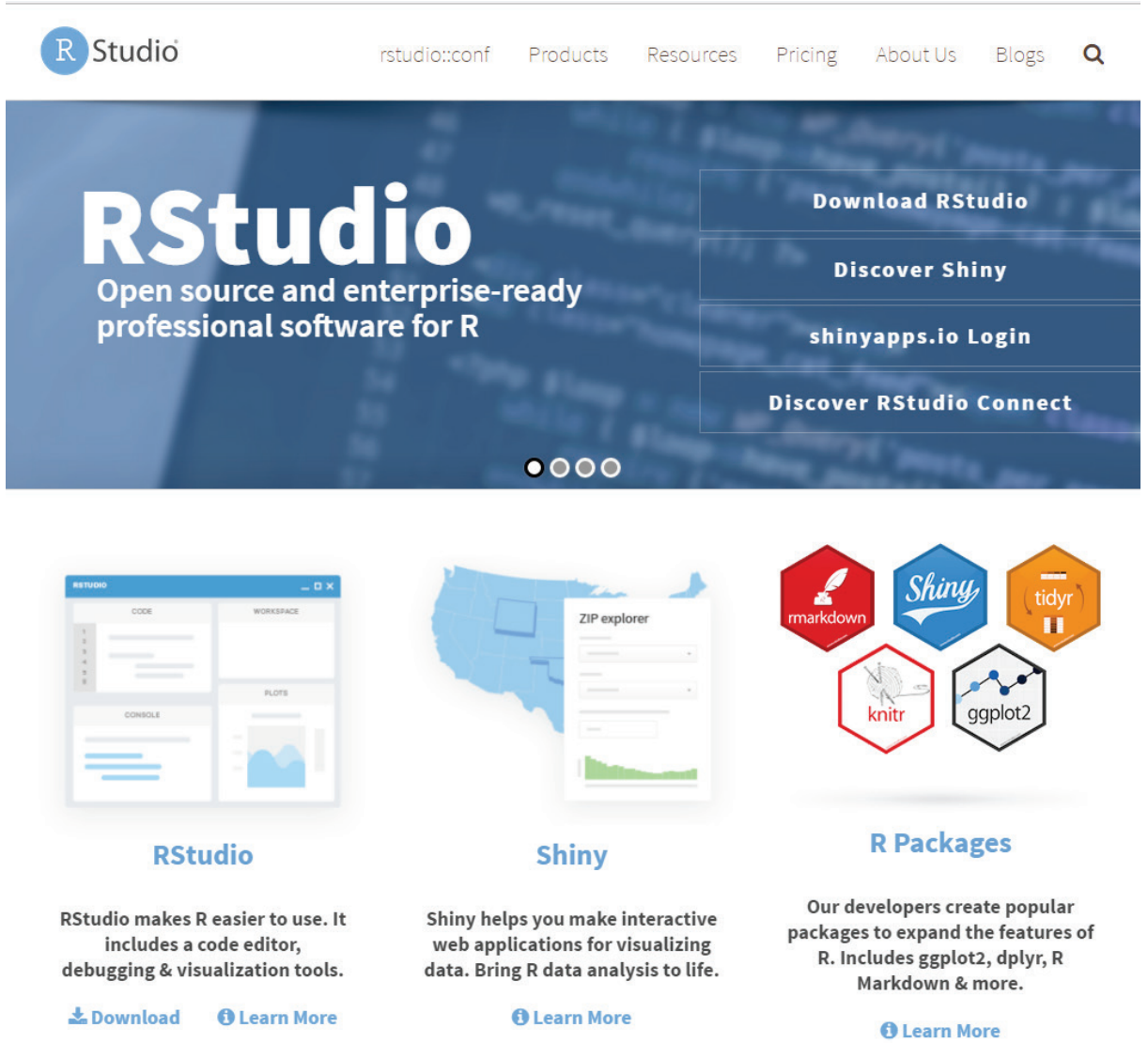
Componentes

- ✓ R (core GUI)
- ✓ Paquetes (extensiones)
- ✓ RStudio (friendly GUI)



Componentes

- ✓ *Rstudio – interfaz para usar R de forma más amigable*



https://www.rstudio.com/

RStudio

- ✓ *Descarga la versión de escritorio libre*

	RStudio Desktop Open Source License	RStudio Desktop Commercial License	RStudio Server Open Source License	RStudio Server Pro Commercial License
	FREE	$995 per year	FREE	$9,995 per year
Integrated Tools for R	●	●	●	●
Priority Support		●		●
Access via Web Browser			●	●
Enterprise Security				●
Project Sharing				●
Manage Multiple R Sessions & Versions				●
Admin Dashboard				●
Load Balancing				●
License	AGPL	Commercial	AGPL	Commercial
Pricing	FREE	$995/yr	FREE	$9,995/yr
	DOWNLOAD	BUY NOW	DOWNLOAD	DOWNLOAD

https://www.rstudio.com/products/rstudio/download/

RStudio

✓ *Elige tu sistema operativo*

RStudio Desktop 1.0.136 — Release Notes

RStudio requires R 2.11.1+ If you don't already have R, download it here.

Installers for Supported Platforms

Installers	Size	Date	MD5
RStudio 1.0.136 - Windows Vista/7/8/10	81.9 MB	2016-12-21	93b3f307f567c33f7a4db4c114099b3e
RStudio 1.0.136 - Mac OS X 10.6+ (64-bit)	71.2 MB	2016-12-21	12d6d6ade0203a2fcef6fe3dea65c1ae
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (32-bit)	85.5 MB	2016-12-21	0a20fb89d8aaeb39b329a640ddadd2c5
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (64-bit)	92.1 MB	2016-12-21	2a73b88a12a9fbaf96251cecf8b41340
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	84.7 MB	2016-12-21	fa6179a7855bff0f939a34c169da45fd
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	85.7 MB	2016-12-21	2b3a148ded380b704e58496befb55545

Zip/Tarballs

Zip/tar archives	Size	Date	MD5
RStudio 1.0.136 - Windows Vista/7/8/10	117.5 MB	2016-12-21	f415939bf5012c0ab127c7cfbc9600be
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (32-bit)	86.2 MB	2016-12-21	fca75f953dd425694b7fd4335bd29165
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (64-bit)	93.2 MB	2016-12-21	7cf0092653aa44fc76325a8f1325fb1f
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	85.4 MB	2016-12-21	30c89299d30ec03b38098e51e9bf49b8
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	86.6 MB	2016-12-21	ea2a262f650e92f568f48edc1c093902

Source Code

A tarball containing source code for RStudio v1.0.136 can be downloaded from here

https://www.rstudio.com/products/rstudio/download/

RStudio

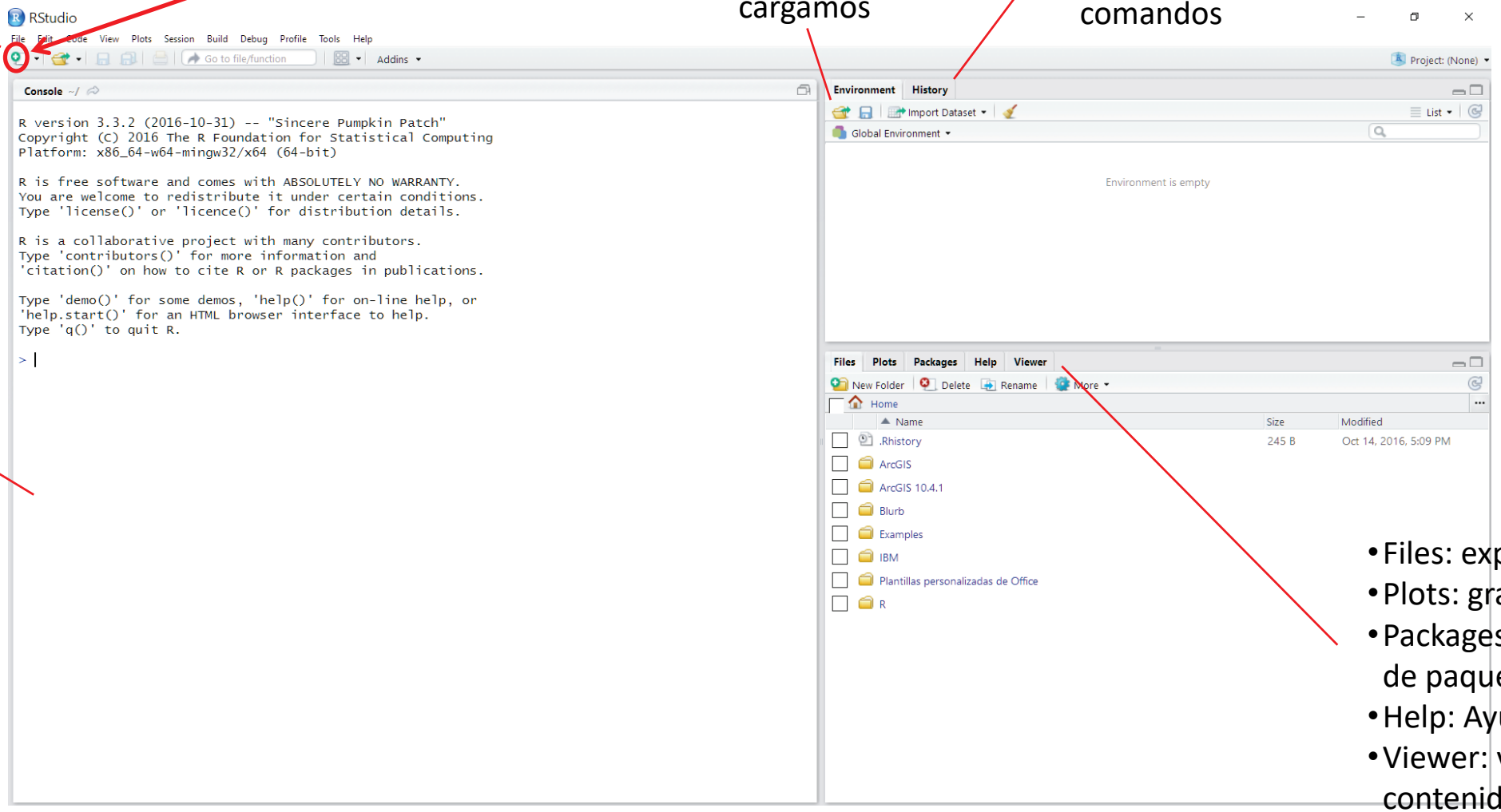
Create a new R Script

Environment: muestra los datos que cargamos

History: muestra el histórico de comandos

Menú: facilita algunas operaciones básicas (crear y guardar scripts, instalar paquetes, etc.

Consola: muestra los resultados



- Files: explorador
- Plots: gráficos
- Packages: búsqueda de paquetes
- Help: Ayuda
- Viewer: visor de contenido web local

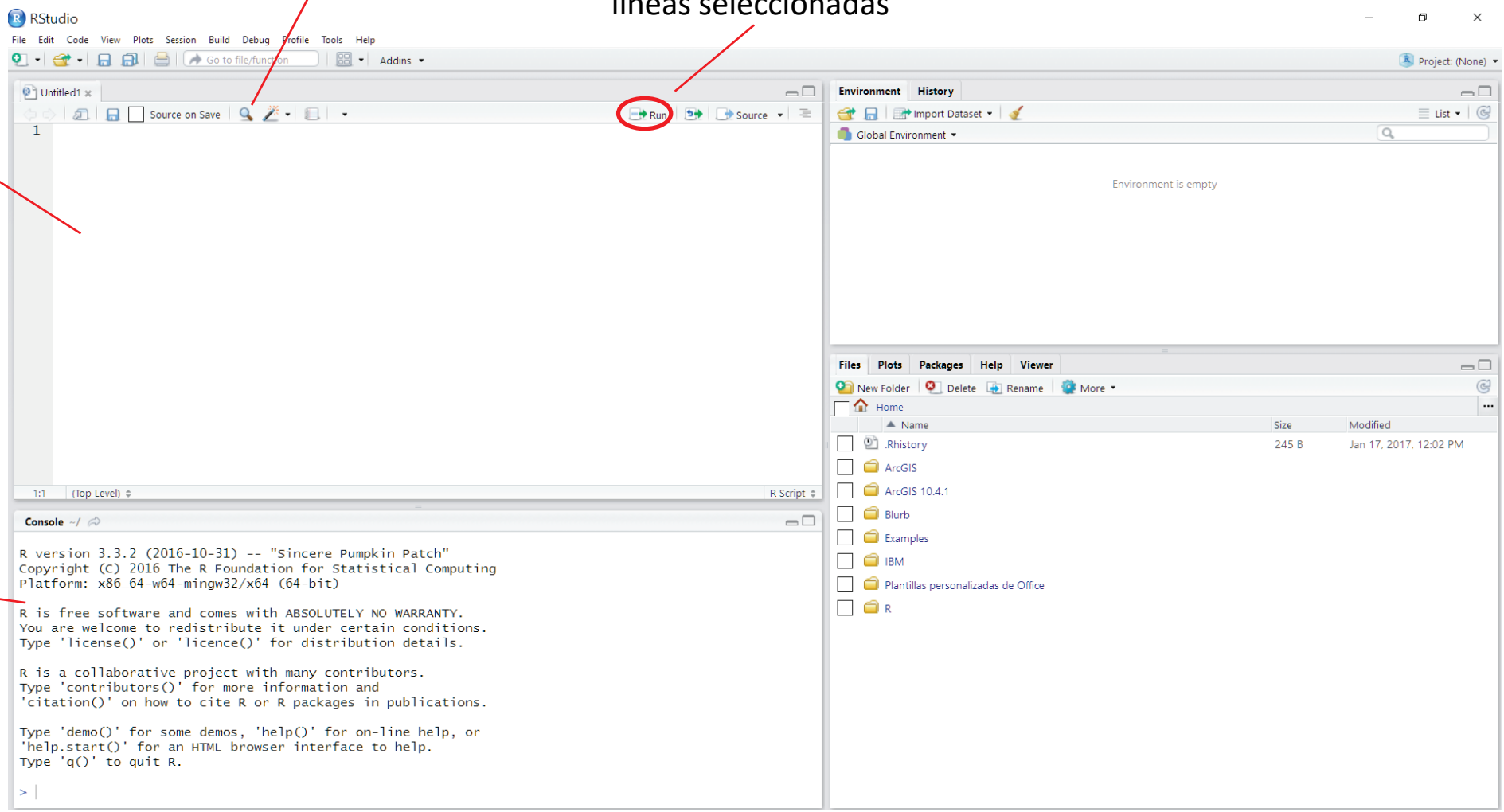
RStudio

Lupa: abre el menú *Buscar y Reemplazar*

Run: Ejecuta el comando de la línea del cursor, o de las líneas seleccionadas

Script: aquí escribimos nuestros comandos

Consola: muestra los comandos ejecutados el resultado (satisfactorio o error)



Análisis espacial en R

CRAN Task View: Analysis of Spatial Data

Maintainer: Roger Bivand
Contact: Roger.Bivand at nhh.no
Version: 2018-06-02
URL: https://CRAN.R-project.org/view=Spatial

Base R includes many functions that can be used for reading, visualising, and analysing spatial data. The focus in this view is on "geographical" spatial data, where observations can be identified with geographical locations, and where additional information about these locations may be retrieved if the location is recorded with care. Base R functions are complemented by contributed packages, some of which are on CRAN, and others are still in development. One active location is R-Forge , which lists "Spatial Data and Statistics" projects in its project tree . Information on R-spatial packages, especially sp is posted on the R-Forge rspatial project website , including a visualisation gallery. Active development of sp is continuing on sp.

The contributed packages address two broad areas: moving spatial data into and out of R, and analysing spatial data in R.

The R-SIG-Geo mailing-list is a good place to begin for obtaining help and discussing questions about both accessing data, and analysing it. The mailing list is a good place to search for information about relevant courses. Further information about courses may be found under the "Events" tab of this blog .

There are a number of contributed tutorials and introductions; a recent one is Introduction to visualising spatial data in R by Robin Lovelace and James Cheshire.

The packages in this view can be roughly structured into the following topics. If you think that some package is missing from the list, please let me know.

https://cran.r-project.org/web/views/Spatial.html

El dato geográfico en R

- Classes for spatial data
- Handling spatial data
- Reading and writing spatial data
- Visualization
- Point pattern analysis
- Geostatistics
- Disease mapping and areal data analysis
- Spatial regression
- Ecological analysis
- …

https://cran.r-project.org/web/views/Spatial.html

El dato geográfico en R

sp

Tabla de atributos (data.frame)

Coordenadas

Bounding box

Sistema de coordenadas (CRS = SRID = EPSG)

```
Formal class 'SpatialLinesDataFrame' [package "sp"] with 4 slots
..@ data       :'data.frame': 1 obs. of  3 variables:
.. ..$ id           : Factor w/ 1 level "a": 1
.. ..$ use          : Factor w/ 1 level "road": 1
.. ..$ cars_per_hour: num 10
..@ lines      :List of 1
.. ..$ :Formal class 'Lines' [package "sp"] with 2 slots
.. .. .. ..@ Lines:List of 1
.. .. .. .. ..$ :Formal class 'Line' [package "sp"] with 1 slot
.. .. .. .. .. .. ..@ coords: num [1:3, 1:2] 0.248 0.993 0.536 0.772 0.67 ...
.. .. .. ..@ ID   : chr "a"
..@ bbox       : num [1:2, 1:2] 0.248 0.261 0.993 0.772
.. ..- attr(*, "dimnames")=List of 2
.. .. ..$ : chr [1:2] "x" "y"
.. .. ..$ : chr [1:2] "min" "max"
..@ proj4string:Formal class 'CRS' [package "sp"] with 1 slot
.. .. ..@ projargs: chr NA
```

https://cengel.github.io/rspatial/2_spDataTypes.nb.html

El dato geográfico en R

sf

```
Simple feature collection with 1 feature and 3 fields
geometry type:  LINESTRING
dimension:      XY
bbox:           xmin: 0.4720064 ymin: 0.01635082 xmax: 0.905913 ymax: 0.2816711
epsg (SRID):    NA
proj4string:    NA
  id  use cars_per_hour                       lnstr_sfc
1  a road            10 LINESTRING(0.47200637566857...
```

Bounding box

Sistema de coordenadas (CRS = SRID = EPSG)

Atributos

Coordenadas

https://cengel.github.io/rspatial/2_spDataTypes.nb.html

Ejercicio_01: Datos espaciales, geovisor y análisis espacial

María Henar Salas Olmedo

04 de diciembre de 2018

1. Objetivos

Con la realización de este ejercicio, el estudiante será capaz de:

1. Importar datos espaciales en R
2. Utilizar las propiedades espaciales de los datos
3. Mostrar los resultados en un geovisor o mapa interactivo

El ejercicio para alcanzar estos objetivos consiste en seleccionar y mostrar en un mapa interactivo los centros de salud del Ayuntamiendo de Madrid que están a 100 metros o menos de una base de bicicletas públicas.

Instalación del paquete sf (recomendado)

1. Instalar o actualizar **R** a la **versión 3.5.1** o superior: https://cran.r-project.org/bin/windows/base/

2. Re-instalar y/o actualizar los paquetes a esta versión: `update.packages(checkBuilt=TRUE, ask=FALSE)`

3. Instalar el paquete sf: `install.packages("sf", dependencies = TRUE)`

Importar shapefile con el paquete sp

```
# Reading shp file as spatial points data frame

filepath <- paste0(input_path, "centros_de_salud_2018")
centros_salud_spdf <- rgdal::readOGR(dsn = filepath,
                                     layer = "centros_de_salud_muni_madrid_2018",
                                     integer64 = 'allow.loss') # to convert integer64 to integer32

# Reading shp file as spatial polygon data frame

filepath <- paste0(input_path, "secciones_censales_2017")
poblacion_spdf <- rgdal::readOGR(dsn = filepath,
                                 layer = "secciones_censales_muni_madrid_2017",
                                 integer64 = 'allow.loss')
```

Añadir campos a la tabla de atributos de un spdf

```
# Creating codigo_seccion field in spdf datasets by adding '28' to GEOCODIGO
poblacion_spdf@data$codigo_seccion <- paste0('28', poblacion_spdf@data$GEOCODIGO)

# Adding poblacion_dt fields by codigo_seccion
poblacion_spdf@data <- merge(poblacion_spdf@data,
                             poblacion_dt,
                             by = 'codigo_seccion',
                             all.x = TRUE)
```

Para acceder a la tabla de atributos, es necesario entrar en el slot 'data':
`población_spdf@data$columna`

Reproyectar spdf en otro sistema de coordenadas

```
# Projecting spdf datasets
bases_bicis_spdf <- spTransform(bases_bicis_spdf, CRS("+init=epsg:4326"))
centros_salud_spdf <- spTransform(centros_salud_spdf, CRS("+init=epsg:4326"))
poblacion_spdf <- spTransform(poblacion_spdf, CRS("+init=epsg:4326"))
```

Añadir una capa a un mapa a partir de un spdf

```
# Bike stations
m = addCircleMarkers(m,
                     data = bases_bicis_spdf,
                     popup = paste0("<strong> Base nº: </strong>",
                                    bases_bicis_spdf@data$`Número`),
                     radius = 5,
                     stroke = TRUE,
                     fillOpacity = 1,
                     fillColor = '#00bfff',
                     color = '#00bfff',
                     group = "BiciMAD")
```

Añadir una capa a un mapa a partir de un spdf

```
# Creating a 100 meter buffer from bike stations
startbufproj = gBuffer(bases_bicis_spdf, width = 100)

# Selecting health centres within a 100 m radius of bike stations
o = sp::over(centros_salud_spdf, startbufproj)
odf = data.frame(o)

# Setting row id as common id
odf$codo = 1:nrow(odf)
centros_salud_spdf$cod = 1:nrow(centros_salud_spdf)

# Selecting health centres that overlap with the 100 meter buffer
odf = subset(odf, odf$o == 1)

# Adding health centre info to the selected ones
near = merge(odf,
                centros_salud_spdf,
                by.x = "codo",
                by.y = "cod",
                all.x = TRUE,
                all.y = FALSE)
```

Recursos

Índice general

https://mappinggis.com/2018/08/analisis-espacial-con-r-usa-r-como-un-sistema-de-informacion-geografica/#Descarga_del_libro

Recursos

Curso de Introducción a R

Vicente Coll Serrano y Pedro J. Pérez

2018-12-03

Contacto

Este **Curso de Introducción a R** es impartido por:

- Vicente Coll Serrano, profesor Titular de Universidad del Área de **Métodos Cuantitativos para la Economía y la Empresa** (Departamento de Economía Aplicada) de la Universidad de Valencia.
- Pedro J. Pérez Vázquez, profesor Titular de Universidad del Departamento de **Análisis Económico** de la Universidad de Valencia.

Para más información puedes contactar con nosotros por correo electrónico: **Vicente Coll** (email), **Pedro J. Pérez** (email)

https://www.uv.es/vcoll/curso_r.html

Recursos

R TUTORIALS: BASICS

by Simon Ejdemyr

Introduction

In this first in a number of tutorials, we'll cover the very basics of R: how to execute code; how to install and load packages; style; and trouble shooting.

Vectors

This tutorial introduces a key object in R: vectors. It explains how to create different types of vectors, how to subset them, how to modify them, and how to summarize them.

Dataset Basics

This tutorial introduces datasets — "data frames" in R. Datasets can be thought of as a collection of vectors stored as columns. We'll talk about how to create datasets and how to read them from file. We'll also talk more conceptually about how datasets should be structured.

Modifying Data

Being able to quickly modify datasets — using tasks like subsetting, sorting, extracting unique observations, renaming variables, dropping variables, and creating new variables — is critical. This tutorial explains how to easily do this in R with functions from the dplyr package.

Collapsing Data

This tutorial explains how to find summary statistics for different categories in a dataset — what is often referred to as collapsing data. Like the tutorial on modifying data, the tutorial draws on a set of intuitive and elegant functions from the dplyr package.

Merging & Appending

This tutorial explains how to combine datasets by merging or appending them. Merging means transferring columns from one dataset to another, while appending means transferring rows from one dataset to another.

https://sejdemyr.github.io/r-tutorials/basics/

Recursos

Introduction to Spatial Data Types in R

claudia engel

Last updated: May 15, 2017

https://cengel.github.io/rspatial/2_spDataTypes.nb.html

Recursos

Geocomputation with R

Robin Lovelace, Jakub Nowosad, Jannes Muenchow

2018-12-03

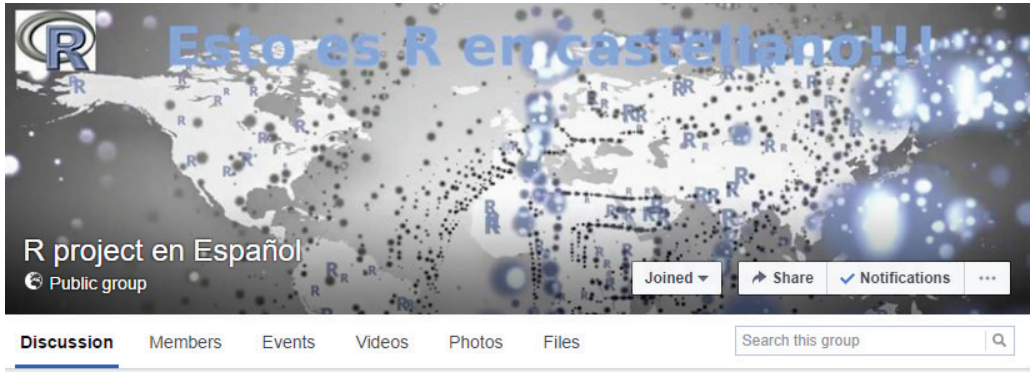
Welcome

This is the online home of *Geocomputation with R*, a book on geographic data analysis, visualization and modeling.

Note: This book has been published by CRC Press in the R Series. The online version of this book is free to read here.

https://geocompr.robinlovelace.net

http://www.tutorialr.es/es/index.html



https://www.facebook.com/groups/rprojectsp/

R-Ladies Madrid

Madrid, España · 995 miembros · Grupo público

Parte de **R-Ladies – 123 grupos**

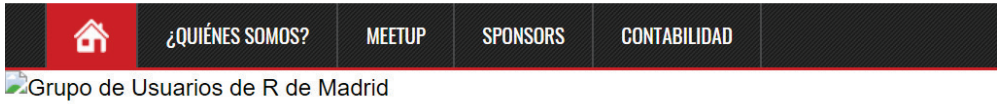
Organizado por

R-Ladies G. y otras 3 personas

https://www.meetup.com/es-ES/rladies-madrid/

Grupo de Usuarios de R de Madrid

Comunidad R-Hispano



Últimos Posts

55 – Miércoles – 15 de noviembre 2018

Autor: cortega | 15 noviembre, 2018 | 0 Comentarios

http://madrid.r-es.org/

Muchas gracias!