



Geostatistics: Integration of R in gvSIG



What is R?

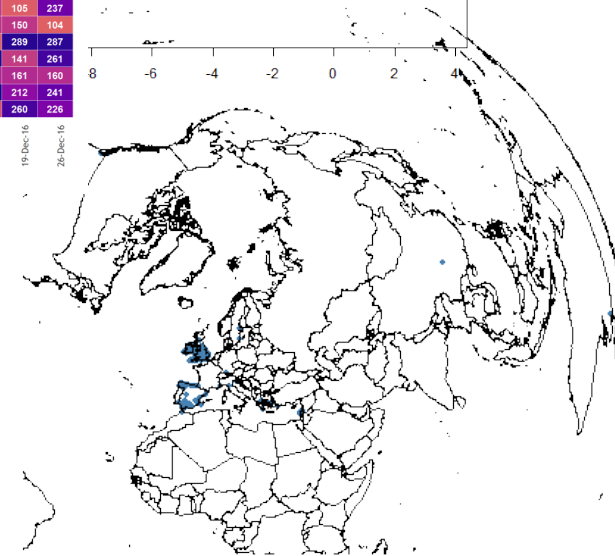
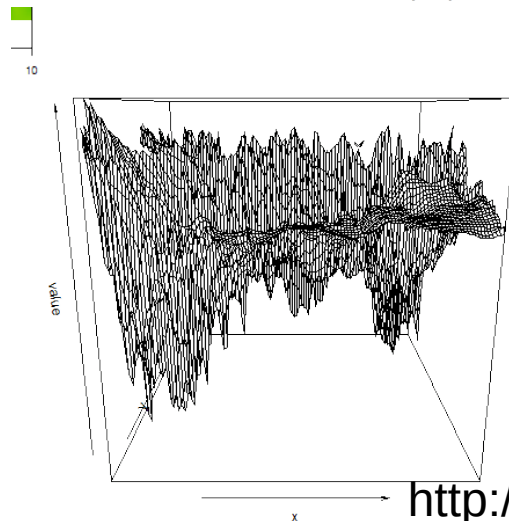
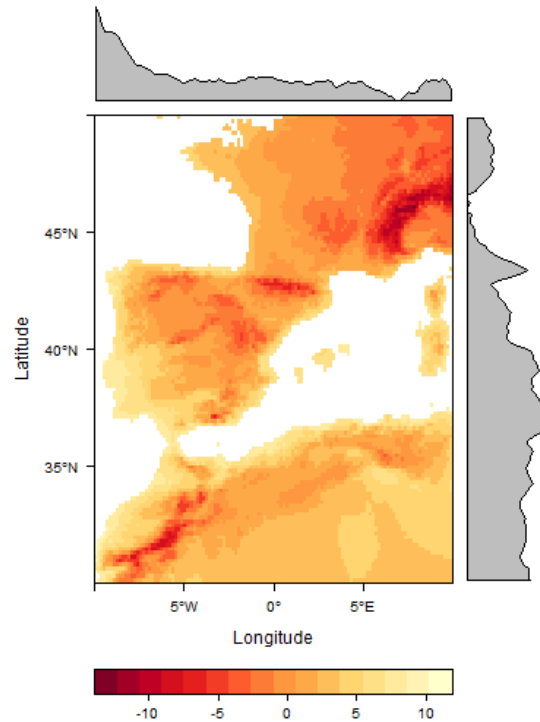
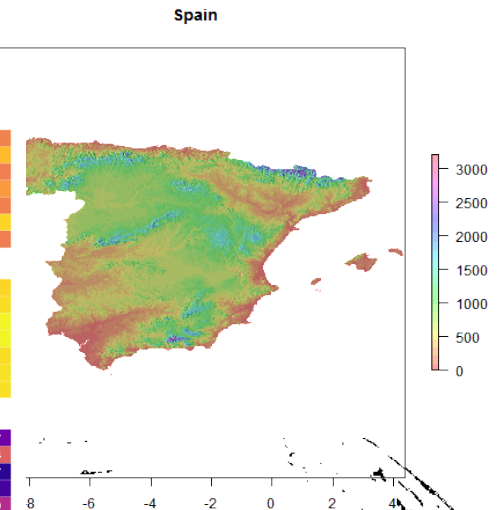
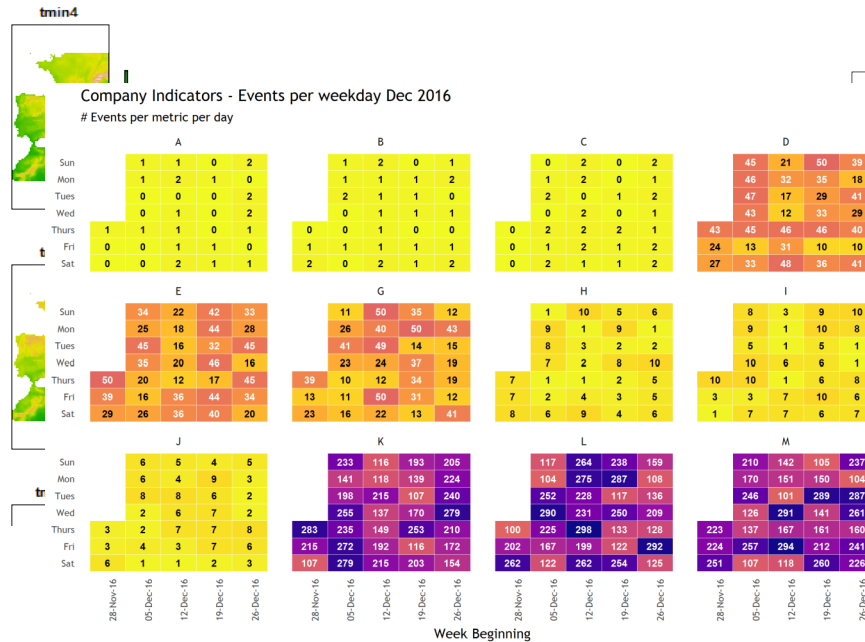
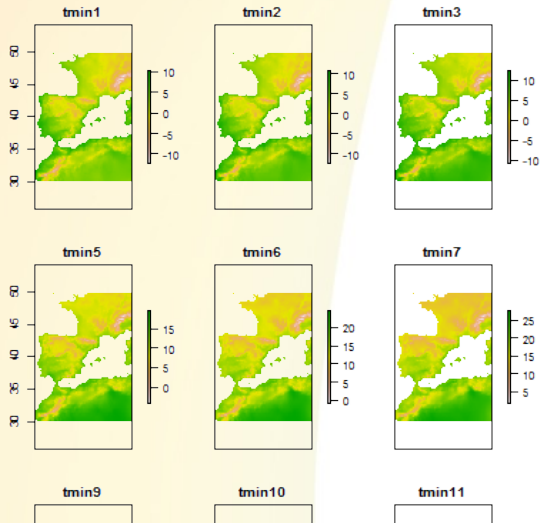
- Open source programming language
- Full software environment for statistical computing and graphics
- Widely used in multiple fields: from economy to biogenetic and geostatistics
- Multi-platform software: UNIX, Windows and MacOS



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

[https://en.wikipedia.org/wiki/R_\(programming_language\)](https://en.wikipedia.org/wiki/R_(programming_language))

What will allow us R?



<http://pakillo.github.io/R-GIS-tutorial/>

R: Contributed packages

Packages for almost everything

- Official packages repository: CRAN (**C**omprehensive **R** **A**rchive **N**etwork)

> install.packages()

Secure CRAN mirrors

```
0-Cloud [https]
Algeria [https]
Australia (Canberra) [https]
Australia (Melbourne) [https]
Australia (Perth) [https]
Austria [https]
Belgium (Ghent) [https]
Brazil (RJ) [https]
Brazil (SP 1) [https]
Bulgaria [https]
Chile 1 [https]
China (Lanzhou) [https]
Colombia (Cali) [https]
Czech Republic [https]
Denmark [https]
Estonia [https]
France (Lyon 1) [https]
France (Lyon 2) [https]
France (Marseille) [https]
France (Montpellier) [https]
France (Paris 2) [https]
Germany (Göttingen) [https]
Germany (Münster) [https]
Iceland [https]
Indonesia (Jakarta) [https]
Ireland [https]
Italy (Padua) [https]
Japan (Tokyo) [https]
Malaysia [https]
Mexico (Mexico City) [https]
Norway [https]
Philippines [https]
Russia (Moscow) [https]
Serbia [https]
Spain (A Coruña) [https]
Spain (Madrid) [https]
Sweden [https]
```

```
Rterm (64-bit)
Platform: x86_64-w64-mingw32/x64 (64-bit)
R es un software libre y viene sin GARANTIA ALGUNA.
Usted puede redistribuirlo bajo ciertas circunstancias.
Escriba 'license()' o 'licence()' para detalles de distribución.

R es un proyecto colaborativo con muchos contribuyentes.
Escriba 'contributors()' para obtener más información y
'citation()' para saber cómo citar R o paquetes de R en publicaciones.

Escriba 'demo()' para demostraciones, 'help()' para el sistema on-line de ayuda,
o 'help.start()' para abrir el sistema de ayuda HTML con su navegador.
Escriba 'q()' para salir de R.

> install.packages("tmap")
Installing package into 'C:/Users/oskmo/Documents/R/win-library/3.4'
(as 'lib' is unspecified)
--- Please select a CRAN mirror for use in this session ---
```

R: Contributed packages

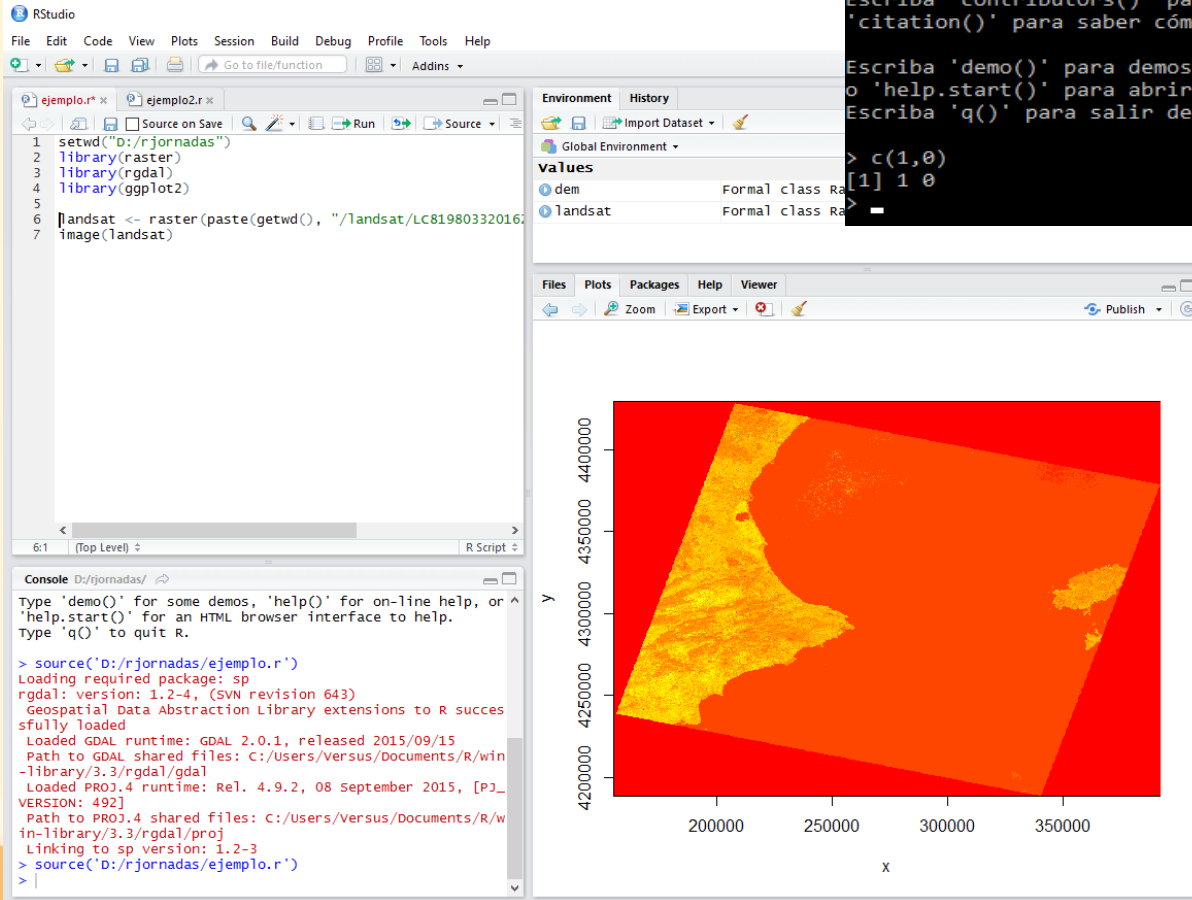
Date	Package	Title
2017-05-17	assertable	Verbose Assertions for Tabular Data (Data.frames and Data.tables)
2017-05-17	Directional	Directional Statistics
2017-05-17	HardyWeinberg	Statistical Tests and Graphics for Hardy-Weinberg Equilibrium
2017-05-17	irlba	Fast Truncated Singular Value Decomposition and Principal Components Analysis for Large Dense and Sparse Matrices
2017-05-17	jmvcore	Dependencies for the 'jamovi' Framework
2017-05-17	tibble	Simple Data Frames
2017-05-17	wally	The Wally Calibration Plot for Risk Prediction Models
2017-05-16	assignPOP	Population Assignment using Genetic, Non-Genetic or Integrated Data in a Machine Learning Framework
2017-05-16	CluMix	Clustering and Visualization of Mixed-Type Data
2017-05-16	corpus	Text Corpus Analysis
2017-05-16	distcomp	Computations over Distributed Data without Aggregation
2017-05-16	dtwSat	Time-Weighted Dynamic Time Warping for Satellite Image Time Series Analysis
2017-05-16	ECOSolveR	Embedded Conic Solver in R
2017-05-16	EmpiricalCalibration	Routines for Performing Empirical Calibration of Observational Study Estimates
2017-05-16	epicontacts	Handling, Visualisation and Analysis of Epidemiological Contacts
2017-05-16	ExcessMass	Excess Mass Calculation and Plots
2017-05-16	FatTailsR	Kiener Distributions and Fat Tails in Finance
2017-05-16	fmsb	Functions for Medical Statistics Book with some Demographic Data
2017-05-16	genoPlotR	Plot Publication-Grade Gene and Genome Maps
2017-05-16	geoparser	Interface to the Geoparser.io API for Identifying and Disambiguating Places Mentioned in Text
2017-05-16	glm.predict	Predicted Values and Discrete Changes for GLM
2017-05-16	hommel	Methods for Closed Testing with Simes Inequality, in Particular Hommel's Method
2017-05-16	kdecopula	Kernel Smoothing for Bivariate Copula Densities
2017-05-16	lessR	Less Code, More Results
2017-05-16	LocalControl	Local Control: An R Package for Generating High Quality Comparative Effectiveness Evidence
2017-05-16	monkeylearn	Accesses the Monkeylearn API for Text Classifiers and Extractors
2017-05-16	MultiPhen	A Package to Test for Pleiotropic Effects
2017-05-16	poisbinom	A Faster Implementation of the Poisson-Binomial Distribution
2017-05-16	prcr	Person-Centered Analysis
2017-05-16	PROscorer	Functions to Score Commonly-Used Patient-Reported Outcome (PRO) Measures and Other Psychometric Instruments

Currently, the CRAN package repository features 10633 available packages.

https://cran.r-project.org/web/packages/available_packages_by_date.html

R: Tools

- R Term
- RStudio



The screenshot shows the RStudio environment with the following components:

- Source Editor:** Contains R code for setting the working directory, loading libraries (raster, rgdal, ggplot2), and creating a raster object from a file path.
- Environment:** Shows the Global Environment with variables 'dem' and 'landsat' of type 'Formal class Raster'.
- Console:** Displays the output of running the script, including package loading messages and GDAL/PROJ4 runtime information.
- Plots:** A spatial plot of the 'landsat' raster is displayed, showing a map with a red background and a yellow/orange area representing the raster data. The plot includes X and Y axes with numerical scales.

Rterm (64-bit)

```
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)
```

```
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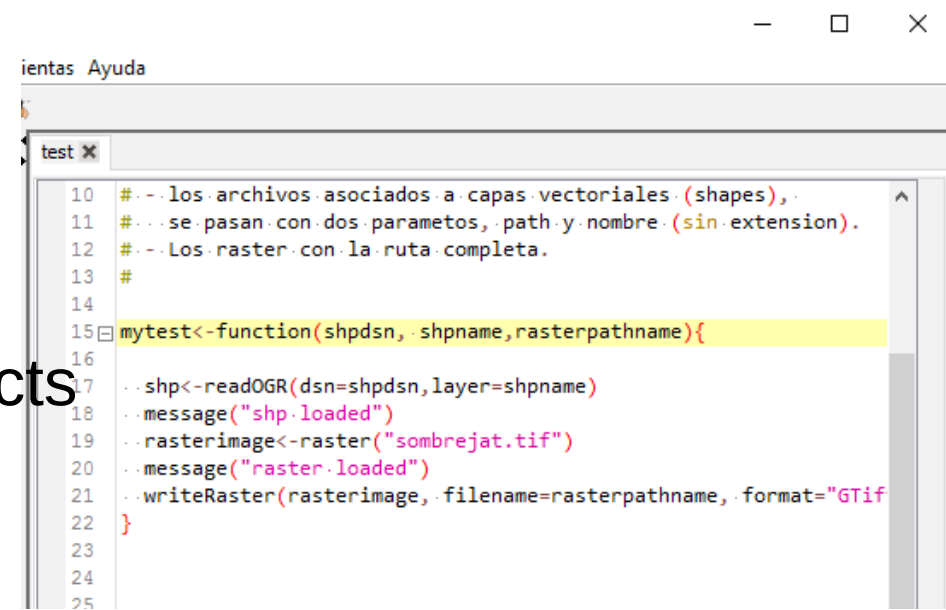
```
> c(1,0)
[1] 1 0
```

Integration of R in gvSIG

- Multiples options
- Through Scripting Module
- Main objective -> Extend gvSIG possibilities:
 - Creating new geoprocesses
 - New functionalities
 - Include R functions in our tools (part of one script)
 - Generate new type of graphs and reports
 - ...

R in gvSIG: Renjin

- Pros:
 - R implementation in Java
 - Fully integrated with gvSIG
 - Works directly with Java objects
- Cons:
 - Packages very limited
 - Not fully functional
 - In development



```
10 #-- los archivos asociados a capas vectoriales (.shapes),  
11 #-- se pasan con dos parametros, path y nombre (sin extension).  
12 #-- Los raster con la ruta completa.  
13 #  
14  
15 mytest<-function(shpdsn, shpname, rasterpathname){  
16  
17   .shp<-readOGR(dsn=shpdsn, layer=shpname)  
18   .message("shp loaded")  
19   .rasterimage<-raster("sombrejat.tif")  
20   .message("raster loaded")  
21   .writeRaster(rasterimage, filename=rasterpathname, format="GTif")  
22 }  
23  
24  
25
```



<http://www.renjin.org/>

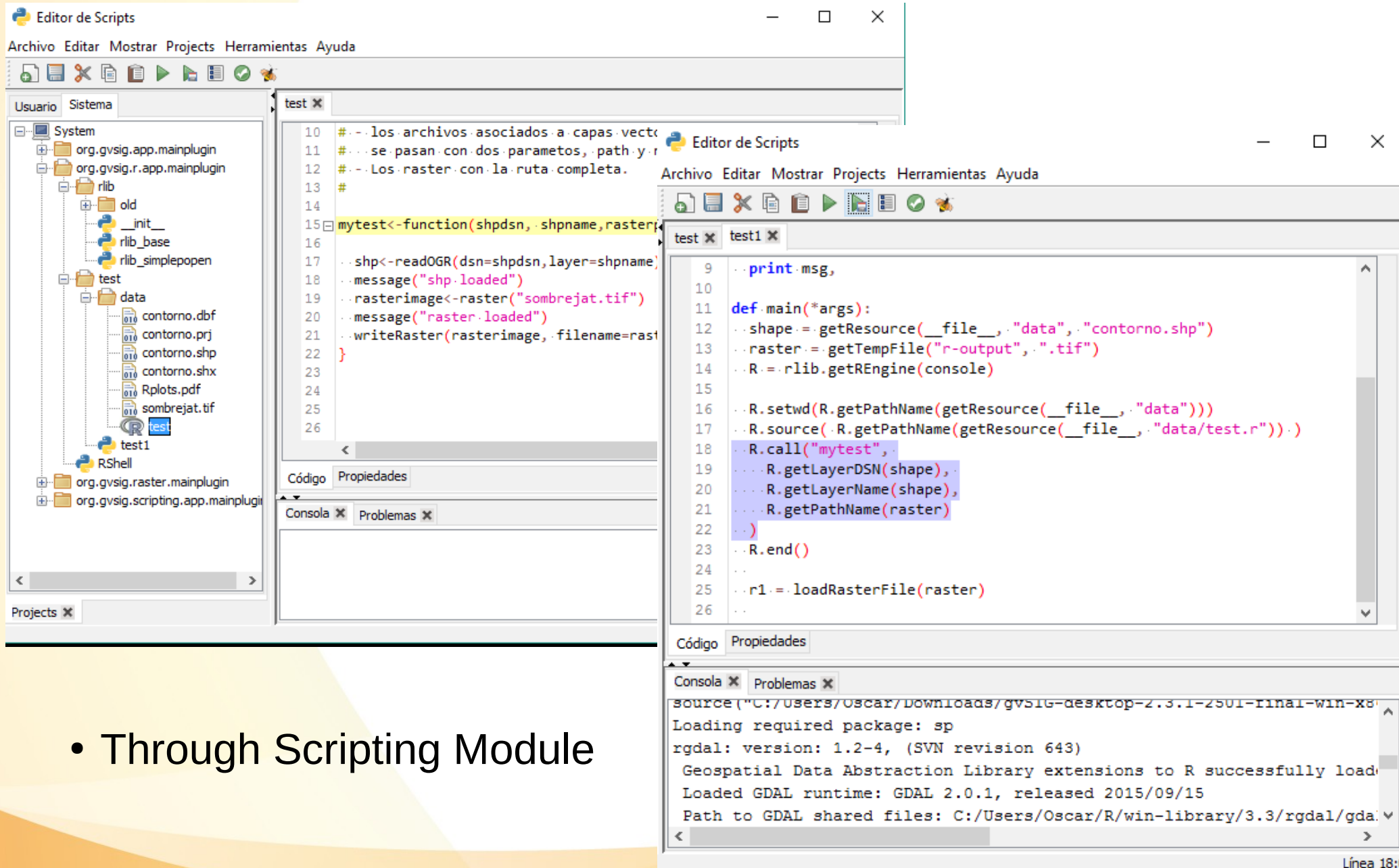
R in gvSIG: Internal R

- Pros:
 - Compatible with all R libraries
 - Included in gvSIG as part of a plugin
 - Easy to install, included in gvSIG Installation and portable
- Cons:
 - Limited integration
 - More complicated to build a tool (libraries management)
 - Not fully updated (option manually)

R in gvSIG: External R

- Pros:
 - Compatible with all libraries
 - Easy to develop (use same R than external tools)
- Cons:
 - Limited integration
 - External installation (not inside gvSIG)
 - Hard to pack in a tool

R in gvSIG: Execution



Editor de Scripts

Archivo Editar Mostrar Projects Herramientas Ayuda

Usuario Sistema

System

- org.gvsig.app.mainplugin
- org.gvsig.r.app.mainplugin
 - riib
 - old
 - _init_
 - riib_base
 - riib_simpleopen
 - test
 - data
 - contorno.dbf
 - contorno.prj
 - contorno.shp
 - contorno.shx
 - Rplots.pdf
 - sombreat.tif
 - test
 - test1
- RShell
- org.gvsig.raster.mainplugin
- org.gvsig.scripting.app.mainplugin

test x

```

10 #... los archivos asociados a capas vectoriales
11 #... se pasan con dos parametros, path y nombre
12 #... Los raster con la ruta completa.
13 #
14
15 mytest<-function(shpdsn, shpname, raster)
16 {
17   shp<-readOGR(dsn=shpdsn, layer=shpname)
18   message("shp loaded")
19   rasterimage<-raster("sombreat.tif")
20   message("raster loaded")
21   writeRaster(rasterimage, filename=raster)
22 }
23
24
25
26

```

Editor de Scripts

Archivo Editar Mostrar Projects Herramientas Ayuda

test x test1 x

```

9   print(msg)
10
11 def main(*args):
12   shape = getResource(__file__, "data", "contorno.shp")
13   raster = getTempFile("r-output", ".tif")
14   R = rlib.getREngine(console)
15
16   R.setwd(R.getPathName(getResource(__file__, "data")))
17   R.source(R.getPathName(getResource(__file__, "data/test.r")))
18   R.call("mytest",
19         R.getLayerDSN(shape),
20         R.getLayerName(shape),
21         R.getPathName(raster)
22   )
23   R.end()
24
25   r1 = loadRasterFile(raster)
26

```

Código Propiedades

Consola x Problemas x

```

source("C:/Users/Oscar/Downloads/gvsig-desktop-2.3.1-2501-rinal-win-x86_64.exe")
Loading required package: sp
rgdal: version: 1.2-4, (SVN revision 643)
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:/Users/Oscar/R/win-library/3.3/rgdal/gdal

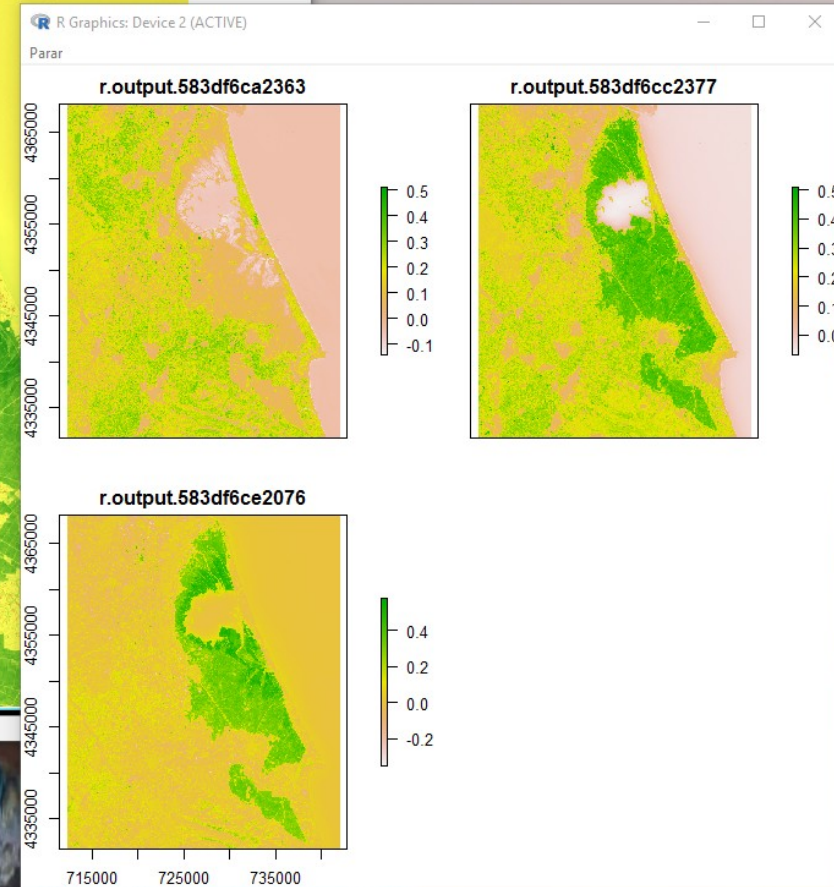
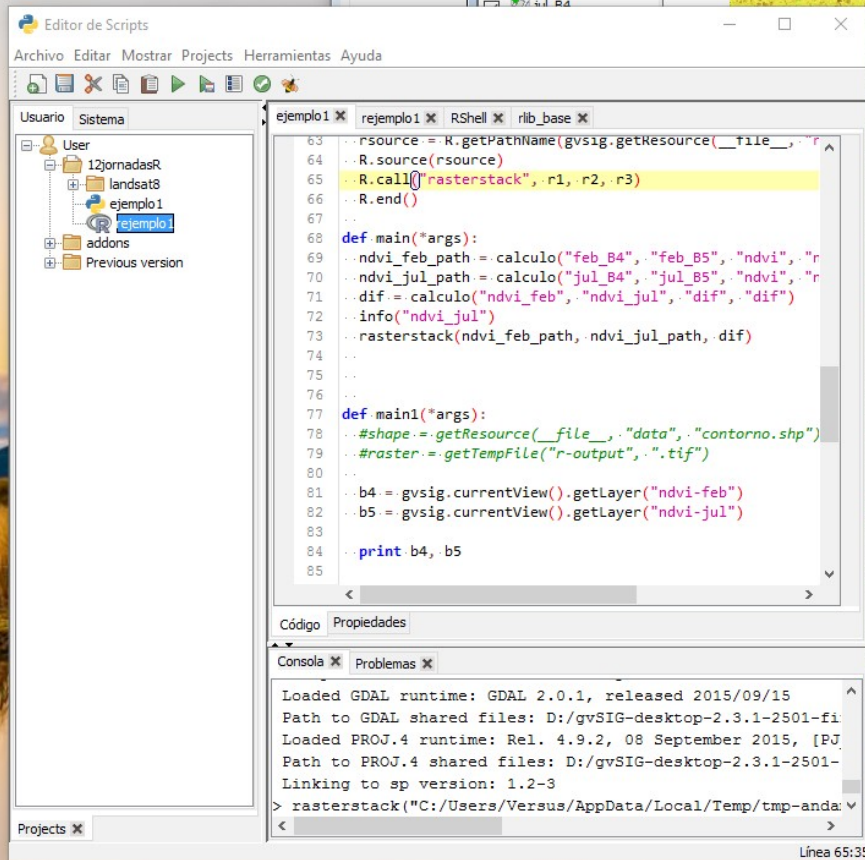
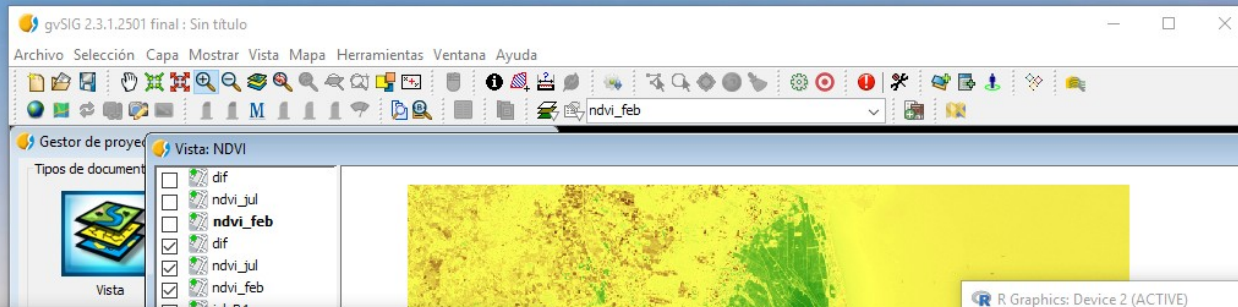
```

Projects x

• Through Scripting Module

Línea 18:0

Documentation: R Workshop



Thanks for being here!

gvSIG Developers List:
<http://www.gvsig.com/en/community/mailling-lists>

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