Introduction to Numerical Analysis

Day 1: Introduction to R (1)

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Outline

Introduction

Introductory books:

- An Introduction to R (R Development Core Team) ▸ Link
- Yet another R Introduction (Andreas Handel) ▸ Link

What is R?

R is an open source software to allows us:

- Data summarization
- Data cleaning
- Data visualization
- Statistical analysis
- Make graphs
- Statistical models
- Machine learning models
- etc,...

It is in constant improvement due to the contribution of many authors of packages (libraries).

What is R?

R also allows us to use/create.

- C++ via (Rcpp)
- Personal pages (Blogdown)
- APIs (e.g. plumber)
- Dashboard (Shiny)
- Documents (Rmarkdown)
- Javascript
- etc...

What is R?

And now we have Quarto! ▸ Link

Let's to work!

Important links for R

- http://www.r-project.org Link
- Download R: http://cran.r-project.org Link
- Download Rstudio: https://posit.co/download/rstudio-desktop/

Installing R and RStudio

Installing R

- Go to R project
- Select the link to download R under the Getting Started section
- Select a CRAN mirror in a country closest to you (they are all copies of the same CRAN server)
- Select the R download for your operating system (Windows/Mac/Linux)
- Download the most recent version of base R

Installing R and RStudio

Installing RStudio

- Go to RStudio
- In the menu, go to Products > RStudio
- Select download RStudio Desktop
- Select Download for RStudio desktop (free) and select the download for you operating system.

Installing R and RStudio

RStudio is an interfaz that provides features to make using and managing R much easier.

Rstudio

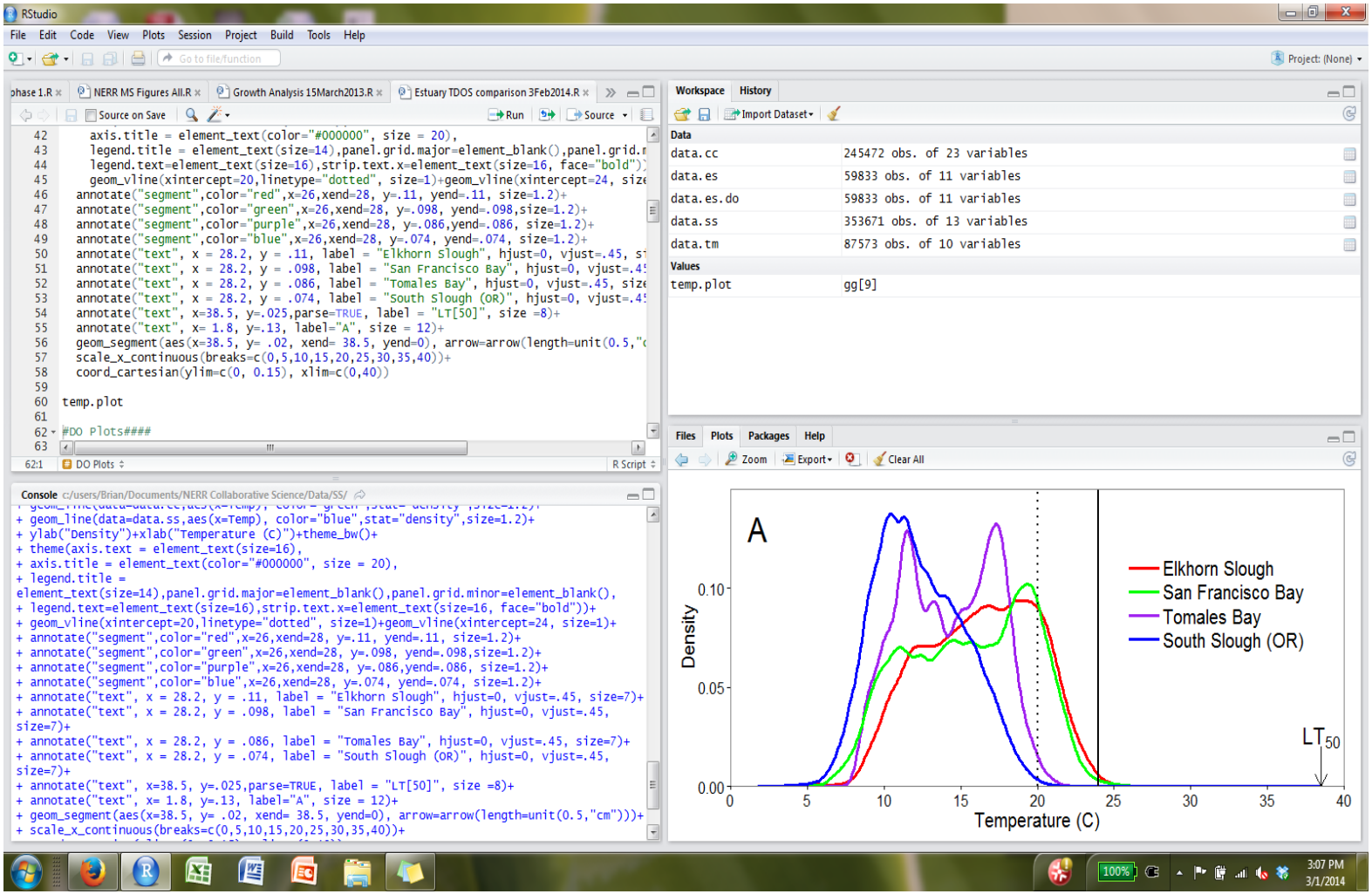

Figure: Rstudio software (picture taken from Internet)

In the interfaz of Rstudio you can find

- Workspace/enviroment tab which tells you what objects are saved and what exists in memory
- History tab which shows previous commands you have run.

What can we do with R?

High quality plots

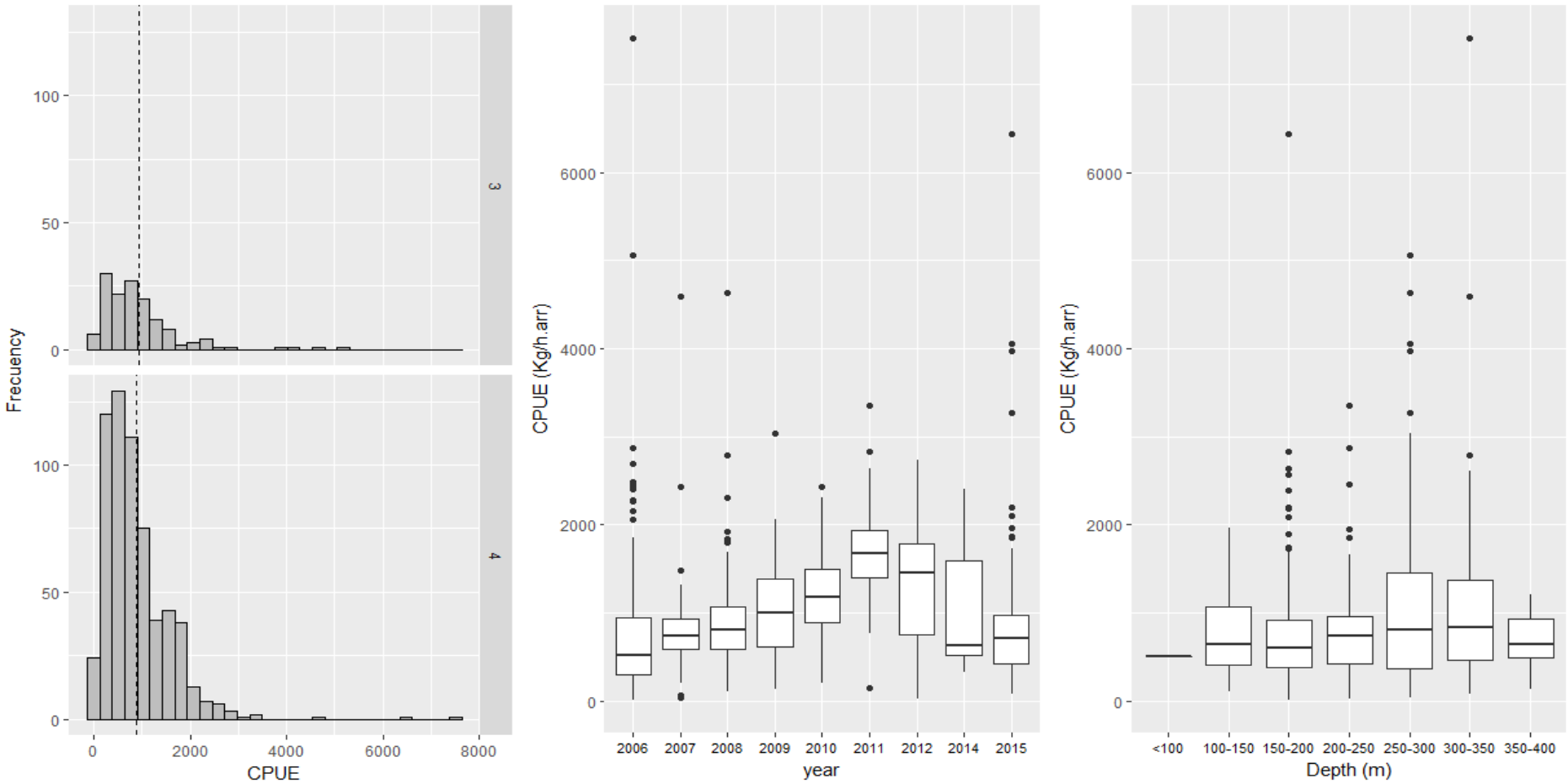

Figure: Histogram and box-plot.

What can we do with R?

Maps for spatial data

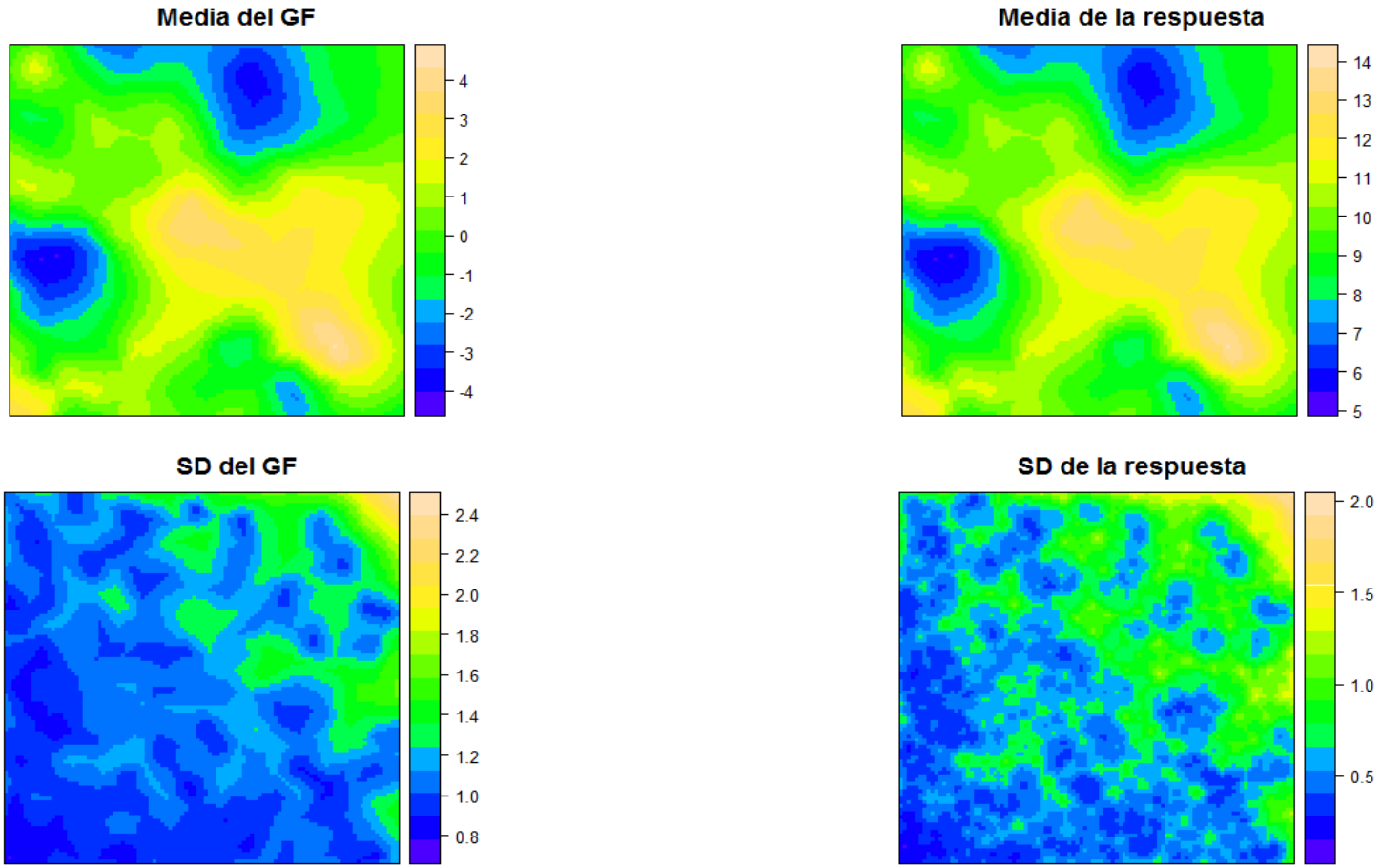

Figure: Mean and sd for a spatial random field.

Important shortcuts in RStudio

- Ctrl+Enter (or CMD+Enter on Mac) will run the current line of code in an R script (the same as copying and pasting the code from your script to the R console).
- Ctlr+1 take you to the script page
- Ctrl+2 takes you to the console

You can check other shortcuts of Rstudio in the next page: ▸ Link

Help?

In R we have a special command to ask about some type of instruction:

- `help(log)` ▸ Link
- `help(glm)` ▸ Link

See you next class!...

Howard, J. P. (2017). Computational Methods for Numerical Analysis with R. CRC Press.