An introduction to

and RStudio

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Modelação Ecológica 2018/2019

LEARNING GOALS

- OBTAIN A WORKING KNOWLEDGE ABOUT THE R SOFTWARE AND ENVIRONMENT, TO BE ABLE TO IMPLEMENT BASIC DATA ANALYSIS

- INTEGRATION OF R AND RSTUDIO, AN HELPFUL R INTERFACE, VIA A SHORT INTRODUCTION TO R AND RSTUDIO FOLLOWED BY A HANDS ON ASSISTED TUTORIAL

THE R ENVIRONMENT

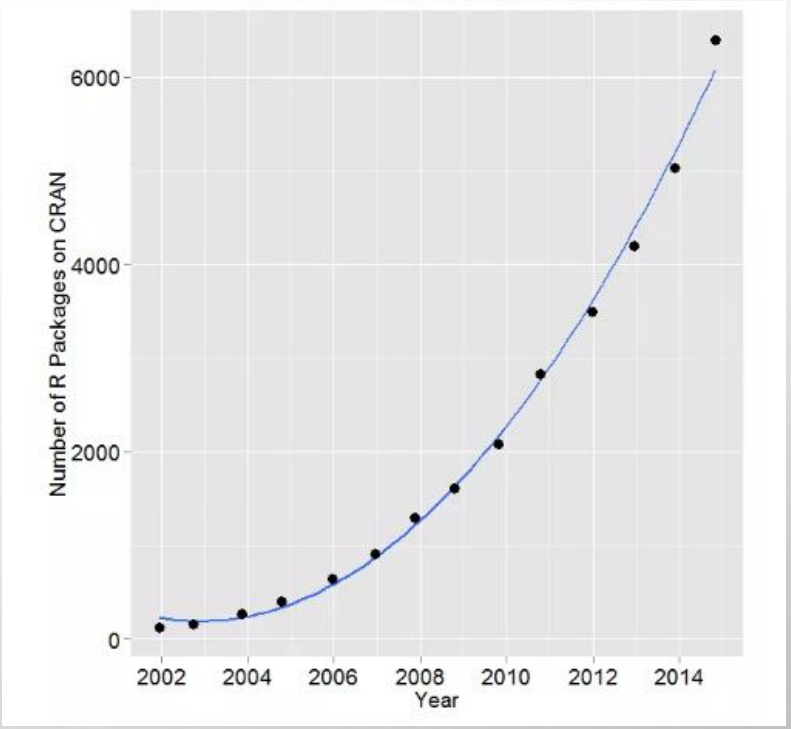
- R IS BOTH A PROGRAMMING LANGUAGE AND AN ENVIRONMENT FOR STATISTICAL COMPUTATION
- R IS FREE OPEN SOURCE SOFTWARE
- CREATED IN 1995 BY ROSS IHAKA AND ROBERT GENTLEMAN, DEPARTMENT OF STATISTICS OF THE UNIVERSITY OF AUCKLAND, AUCKLAND, NEW ZEALAND (GETS ITS NAME FROM ANOTHER FAMOUS PROGRAMMING LANGUAGE FOR DATA ANALYSIS, S)
- PROJECT IS RUN BY THE APPROPRIATELY NAMED "R CORE DEVELOPMENT TEAM"
- SOFTWARE AND EXTENSIVE RESOURCES AVAILABLE AT

HTTP://WWW.R-PROJECT.ORG

LATEST VERSION WAS **R VERSION 3.4.3** (THOSE GUYS ARE FAST…THIS MIGHT BE OUTDATED TODAY!)

THE R BASE + PACKAGES

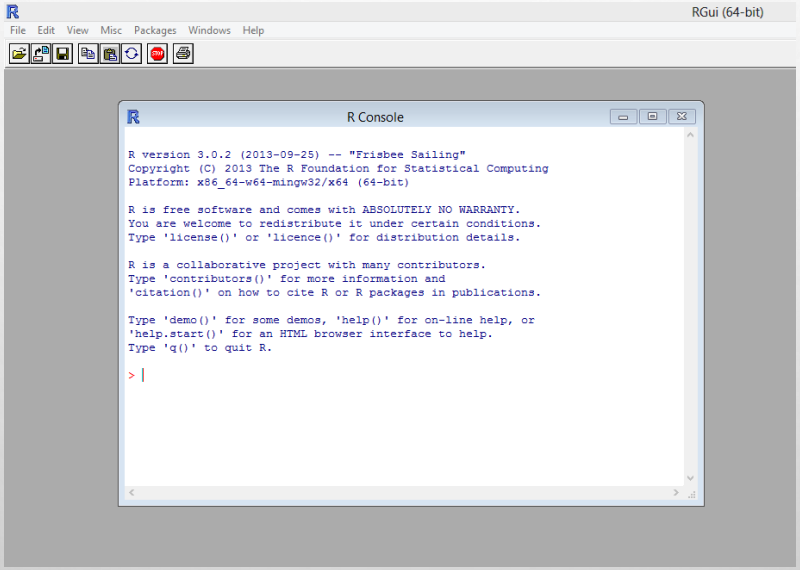
- R BASE INSTALLATION COMES WITH A NUMBER OF LIBRARIES WHICH PROVIDE ACCESS TO A LARGE NUMBER OF COMMONLY USED FEATURES (E.G. LINEAR MODELS, SURVIVAL ANALYSIS, BASIC STATISTICAL DISTRIBUTIONS, ETC)
- HOWEVER, ONE OF ITS STRENGTHS COMES FROM THE FACT THAT MANY MORE PACKAGES ARE AVAILABLE ONLINE



SOURCE:
HTTP://R4STATS.COM/ARTICLES/POPULARITY/

THE R ENVIRONMENT

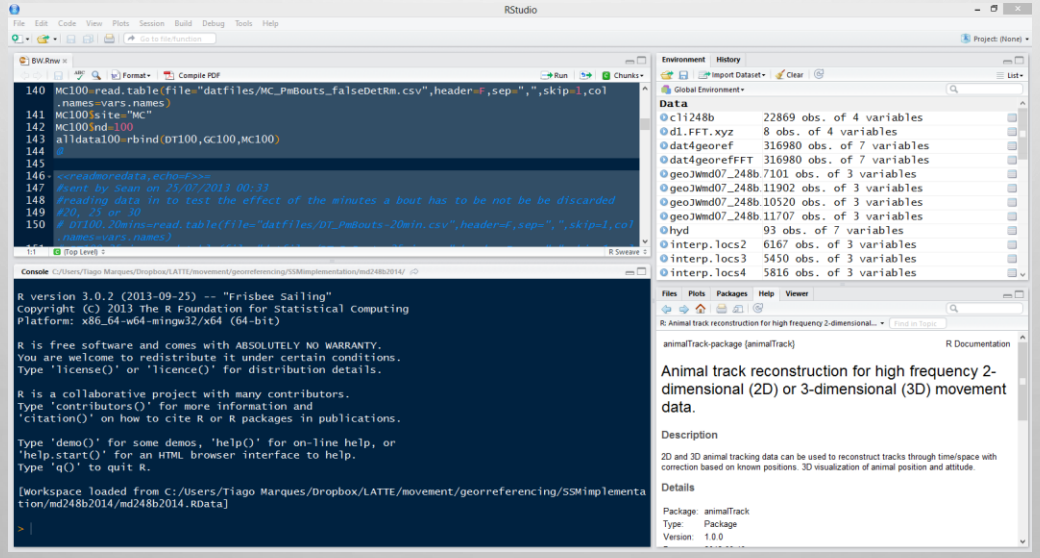
- R WAS TRADITIONALLY ACCESSED SOLELY VIA THE COMMAND LINE, MAKING THE LEARNING CURVE RATHER STEEP FOR BEGINNERS



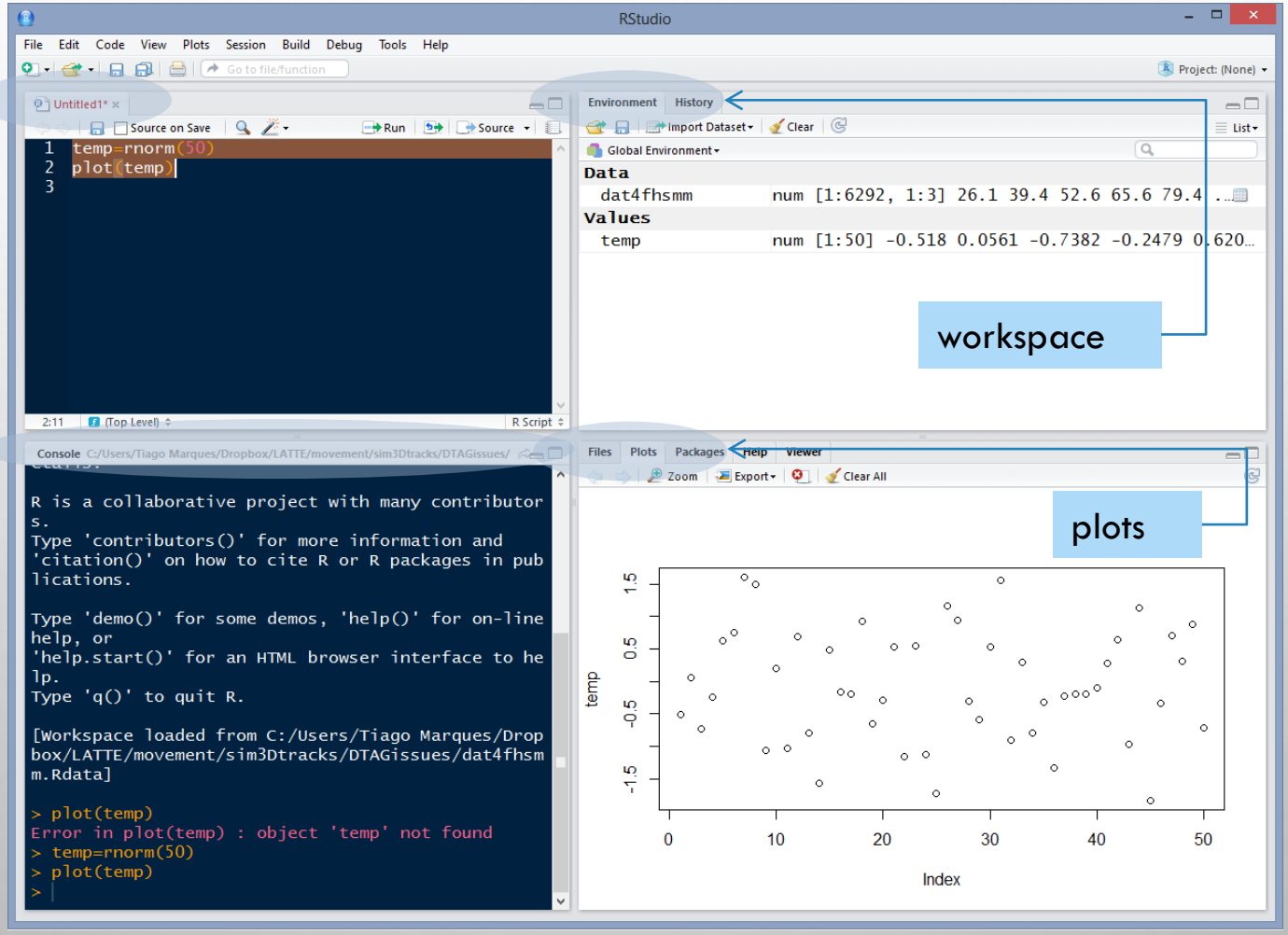
- HERE WE FOCUS ON RSTUDIO, A PROGRAM TO INTERFACE WITH R, MAKING MANY OF THE MOST COMMON TASKS SIMPLER. LET'S OPEN RSTUDIO SHALL WE?

RSTUDIO

- (AS R) FREE AND OPEN SOURCE
- AN INTEGRATED DEVELOPMENT ENVIRONMENT FOR DATA ANALYSIS
- SIMPLIFIES THE USER INTERACTION WITH R
- IN A SINGLE APPLICATION YOU HAVE ACCESS TO A NUMBER OF WINDOWS CONTAINING THE CODE, THE COMMAND LINE, THE FIGURES, THE HELP, A WINDOWS EXPLORER, ETC.



4 WINDOWS, 4 WAYS TO INTERACT WITH R

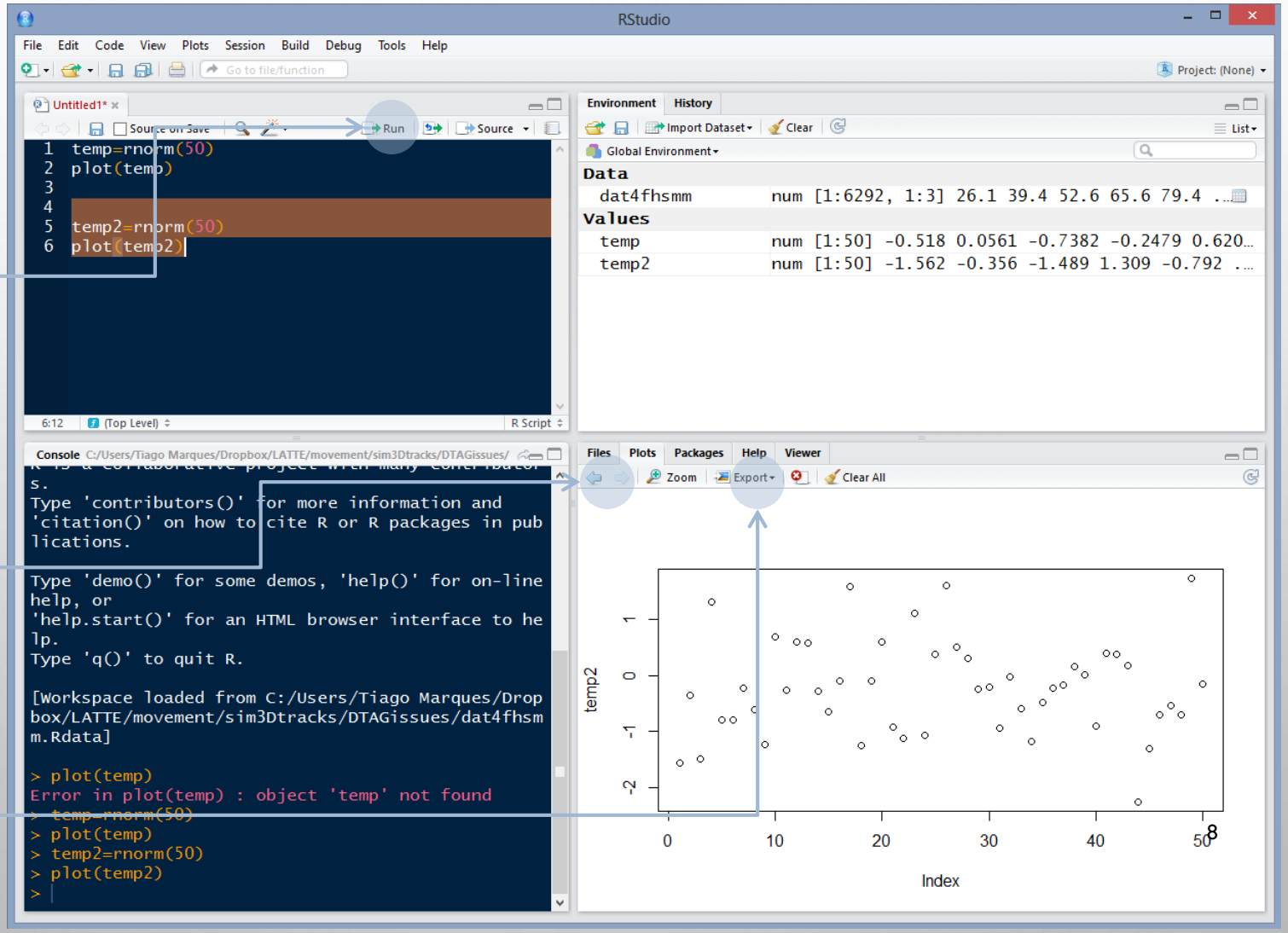


THE CODE AND PLOTS TABS

Sends and executes current line or selected text to console

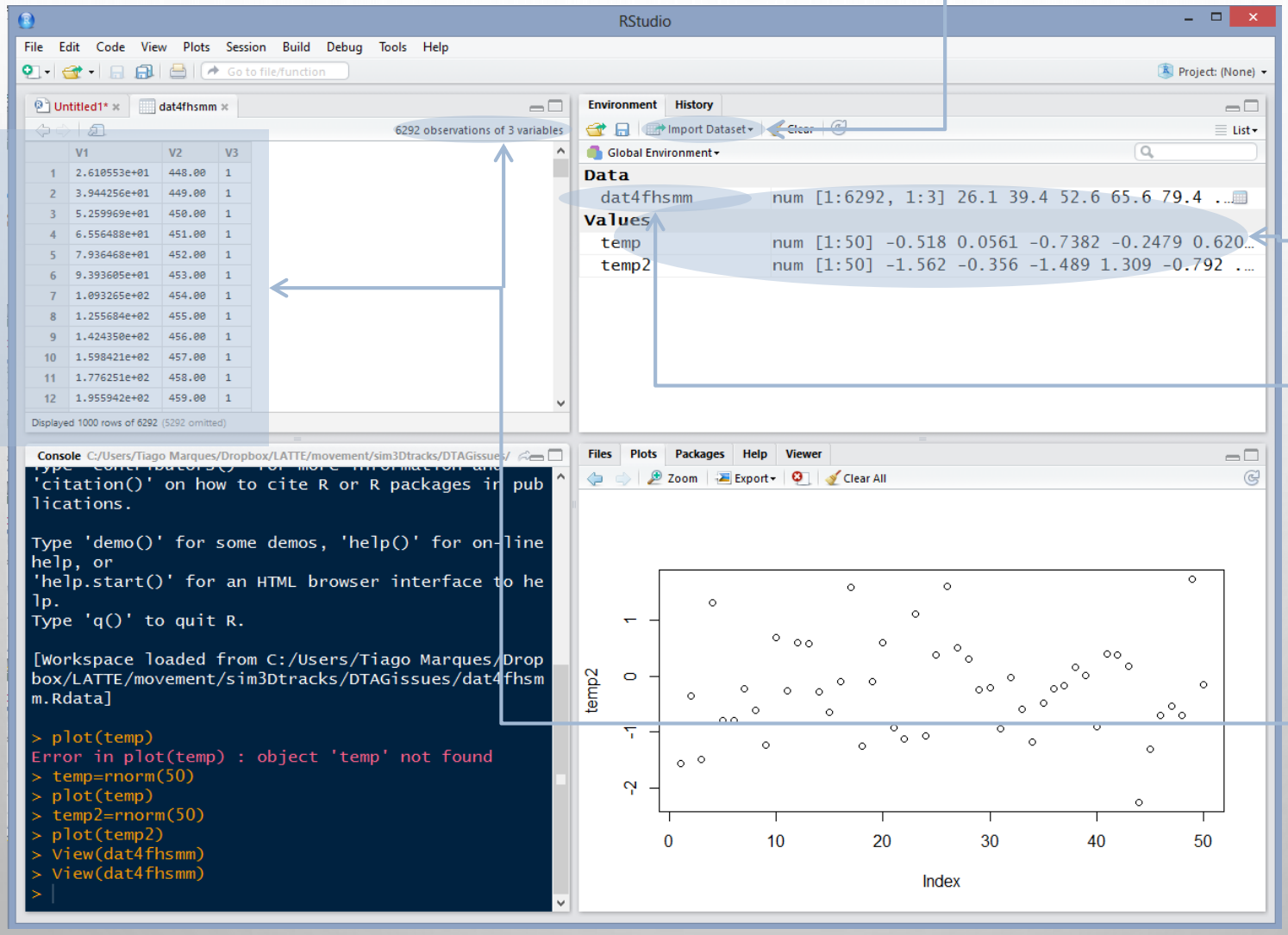
Move back and forth in a figure log

Export figures as pdf or jpeg



THE ENVIRONMENT TAB

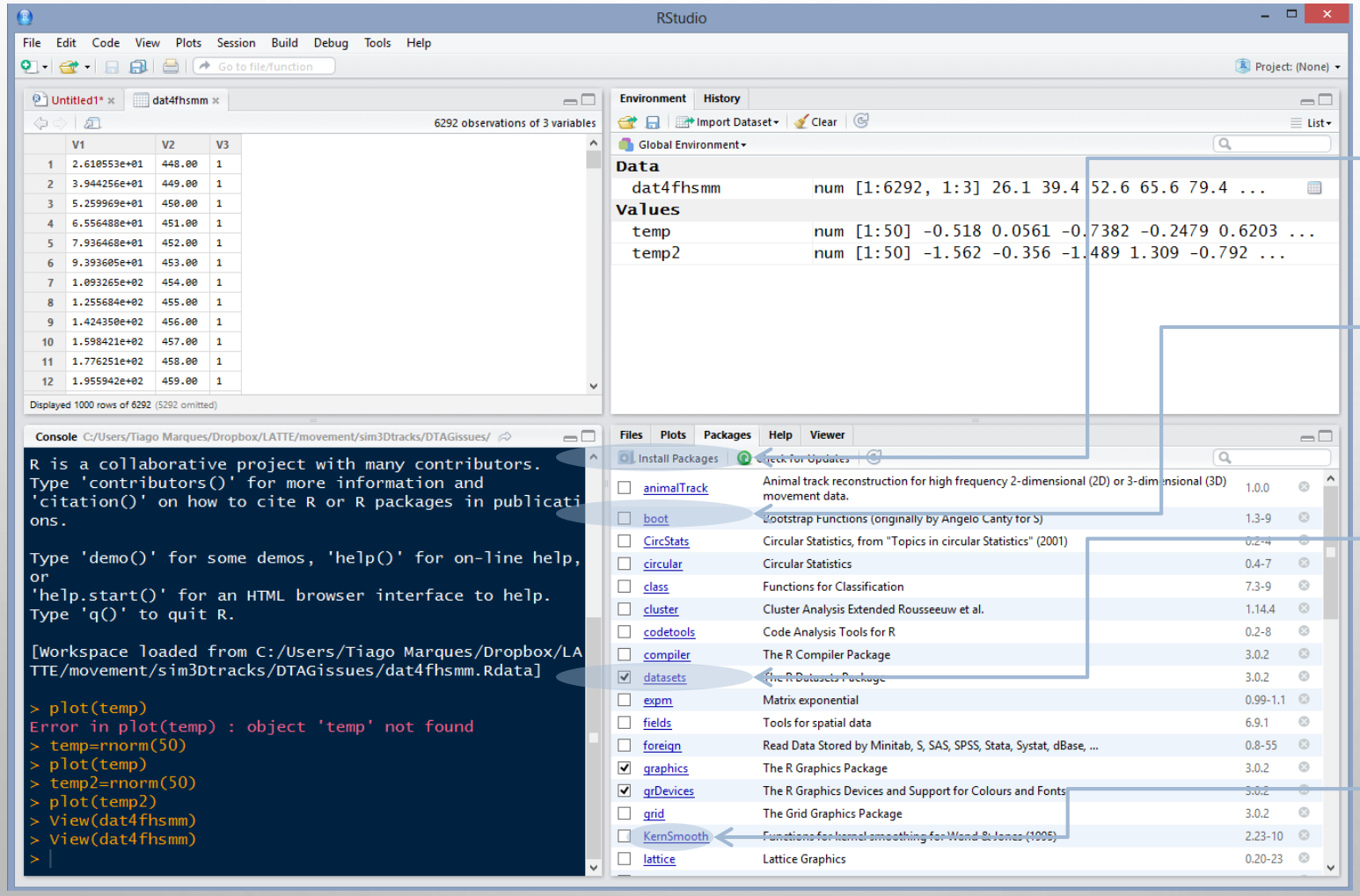
Shortcut for data import



Objects available in workspace (+ details)

Pressing most objects names gives you a preview of what they are

THE PACKAGES TAB



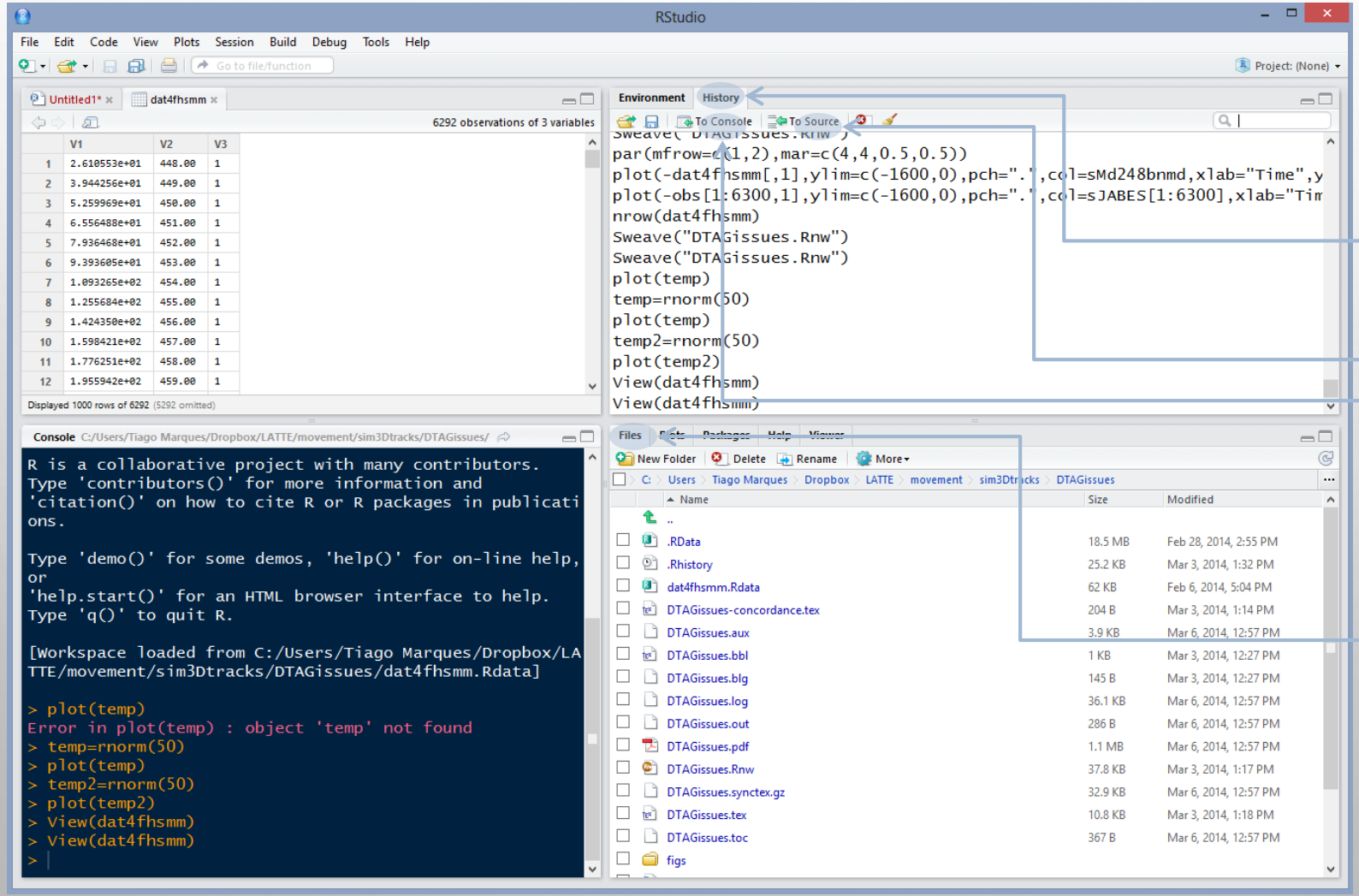
install a package

an installed package

an installed and loaded package

click the name for package description

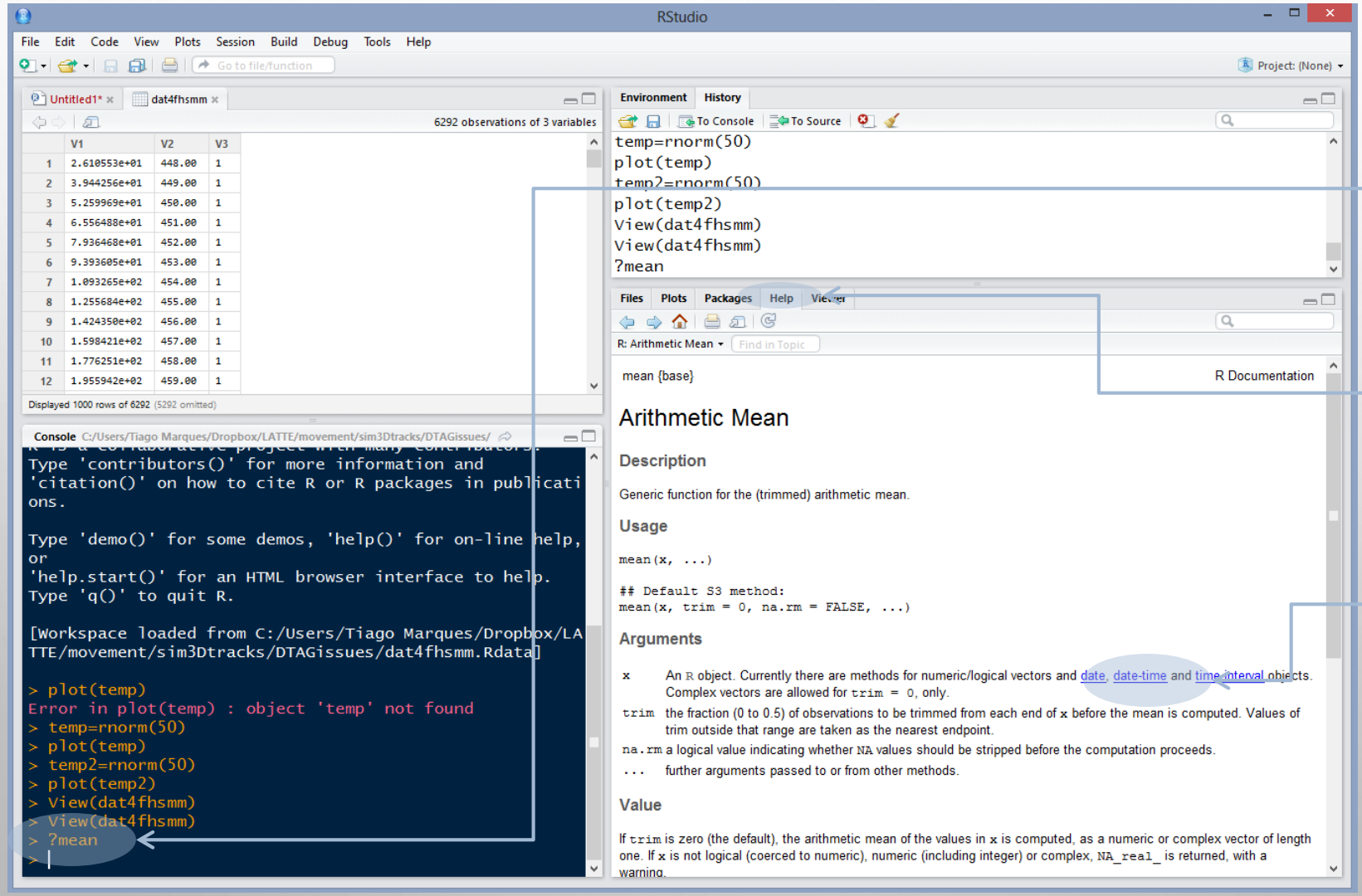
THE HISTORY AND "WINDOWS EXPLORER" TABS



The command history (with shortcuts to send commands to source or console)

To see the files in your working directory (select a file to load or open it)

THE HELP TAB

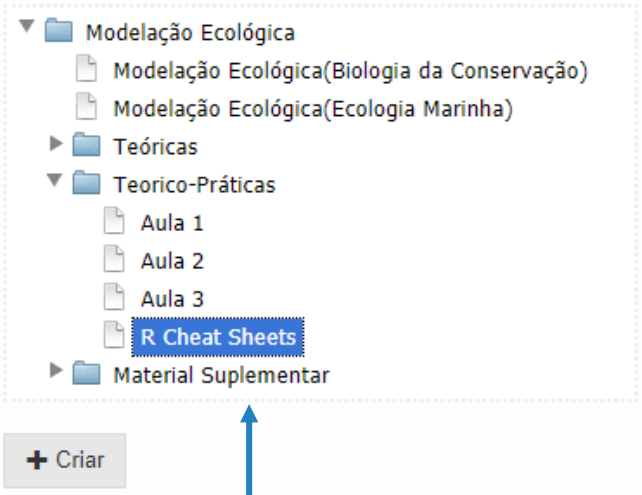


If you call for help...

This is where it will show up

With hyperlinks for easy navigation

R HAS AMAZING (ENDLESS) ONLINE RESOURCES



And I have added a few cheat sheets ("cábulas") in Fenix

R Cheat Sheets

Página | Ficheiros 7 | Permissões | Link

Adicionar Ficheiro

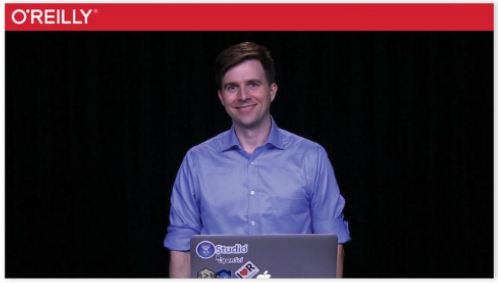
#	Nome	Permissões
1	advancedR.pdf	Público
2	base-r.pdf	Público
3	how-big-is-your-graph.pdf	Público
4	regex.pdf	Público
5	rmarkdown-reference.pdf	Público
6	rmarkdown-2.0.pdf	Público
7	rstudio-ide.pdf	Público

R MARKDOWN AND DYNAMIC REPORTS

O'REILLY®

Safari

Search... Enterprise Pricing Sign In START FREE TRIAL



Reproducible Research and Reports with R Markdown

★★★★★ 2 reviews

START WATCHING

by Garrett Grolemund

Publisher: O'Reilly Media, Inc.

Release Date: May 2016

ISBN: 9781491959534

View table of contents

Video Description

R Markdown does three main things pretty close to magic. First, it lets you make a completely reproducible, parameter-set and automatable R report. Second, it lets you export that report into a multitude of formats (HTML, Word, .js slide show, interactive web app, etc.). Third, it does the first two things really fast. Wishing for a way to document your code so it still makes sense to you or somebody else six months down the road? Presto! R Markdown does that. Hoping for a button you could click to reproduce your entire analysis with a new data set or parameter? Shazaam! R Markdown does that. Sick of having to copy and paste your results? Poof! R Markdown takes the pain away. If you're an analyst, scientist, actuary, statistician, or a programmer familiar with R, you should add this package to your bag of tricks.

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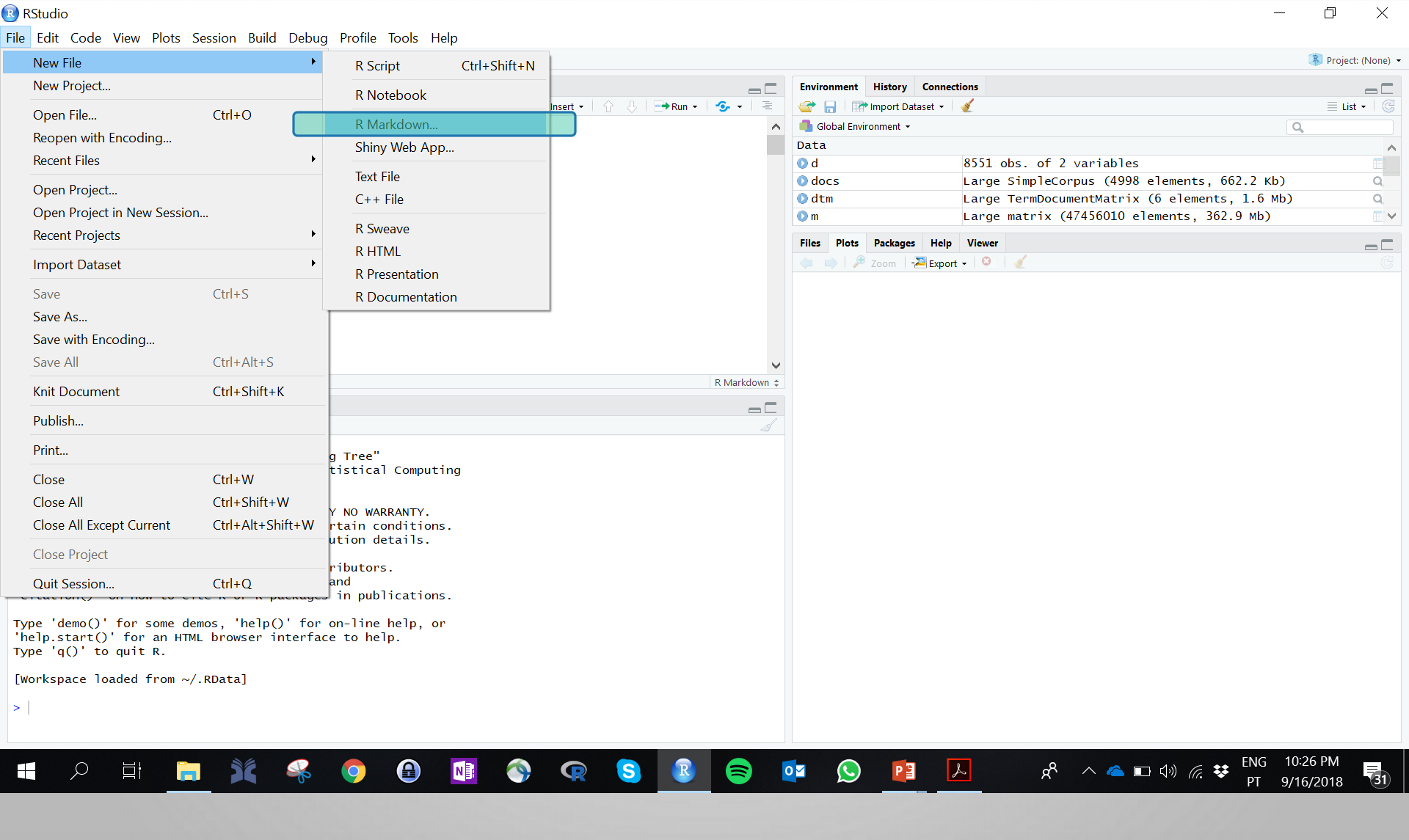
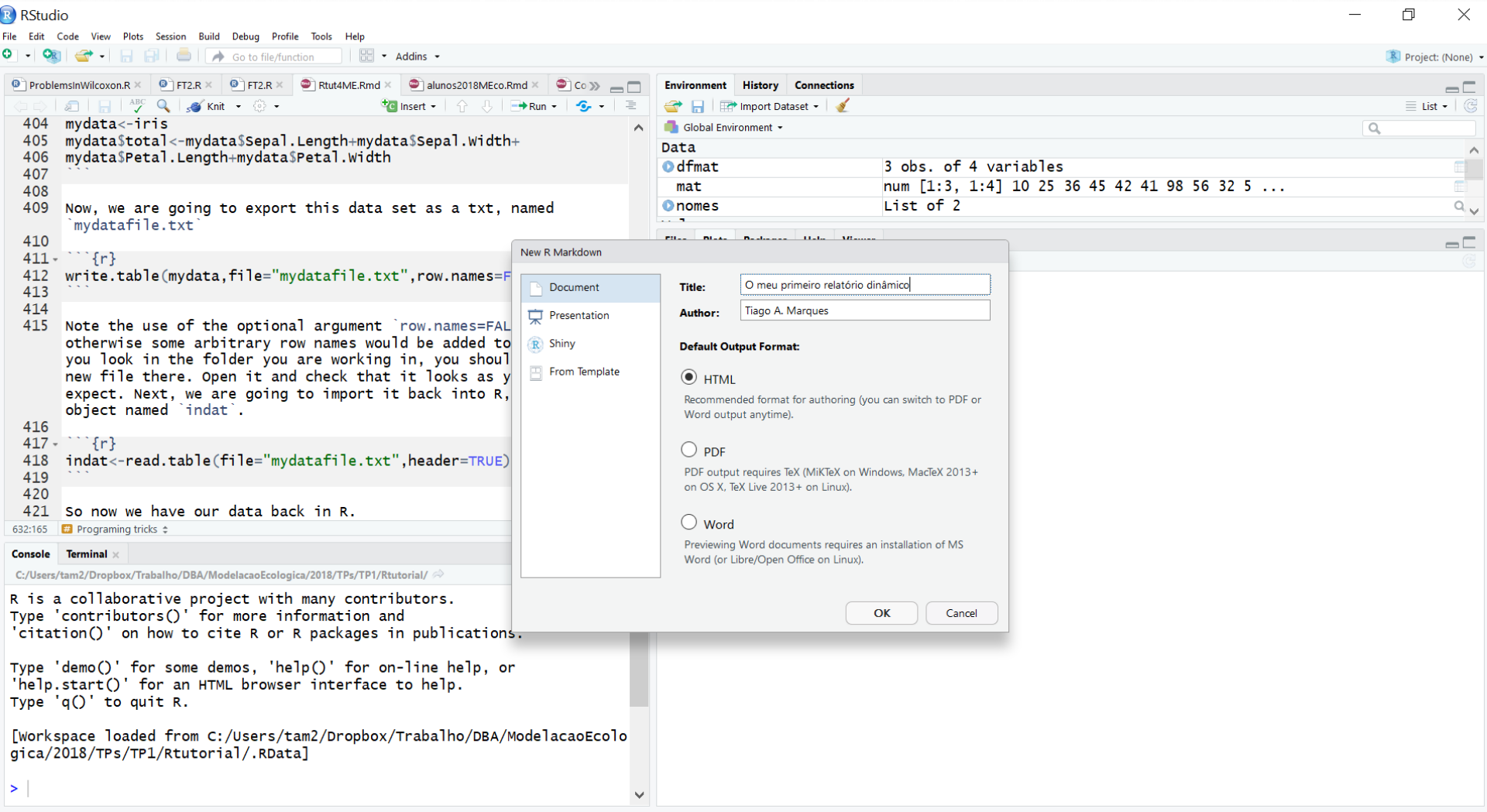
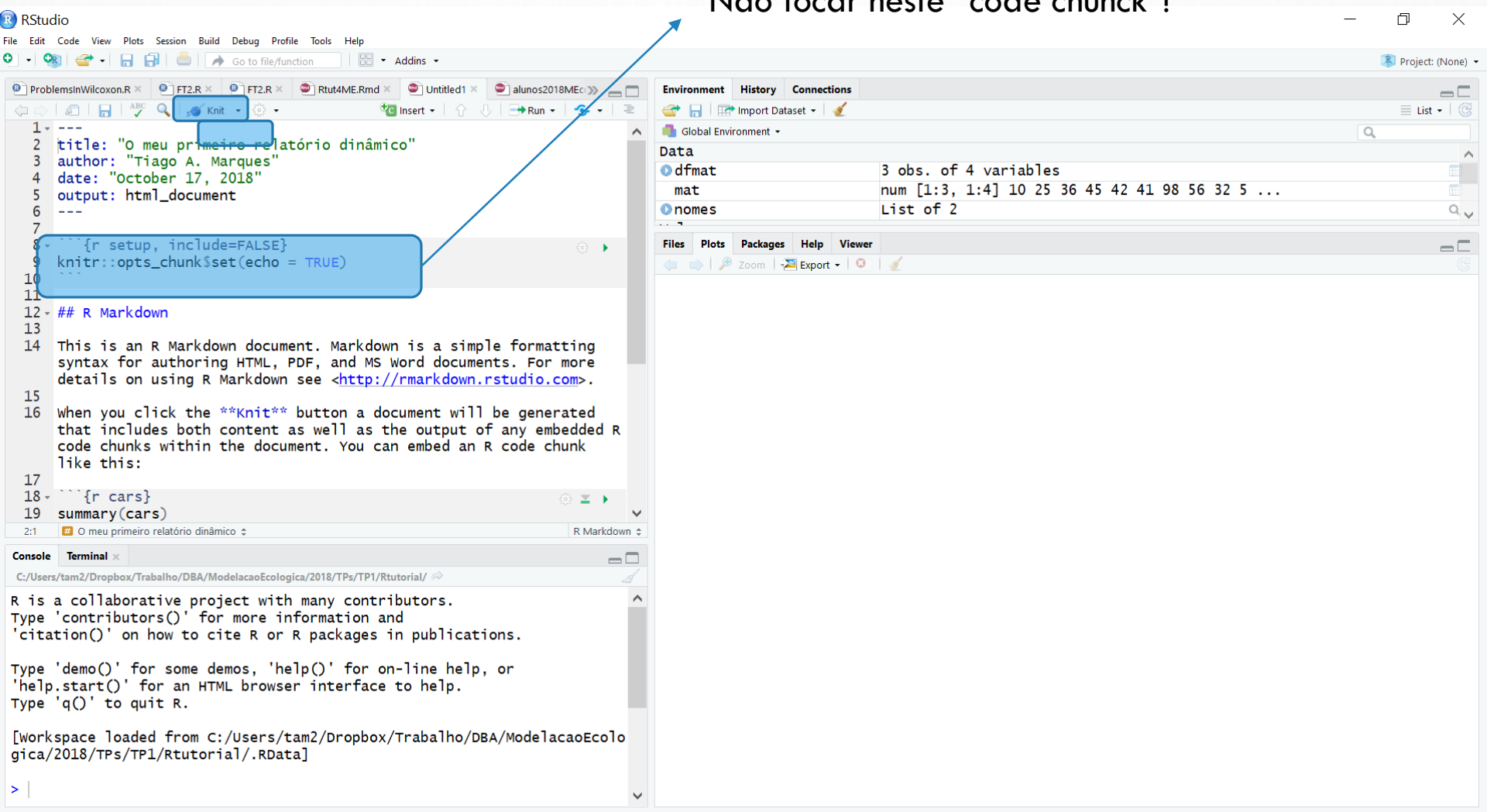
https://www.oreilly.com/library/view/reproducible-research-and/9781491959534/video245667.html

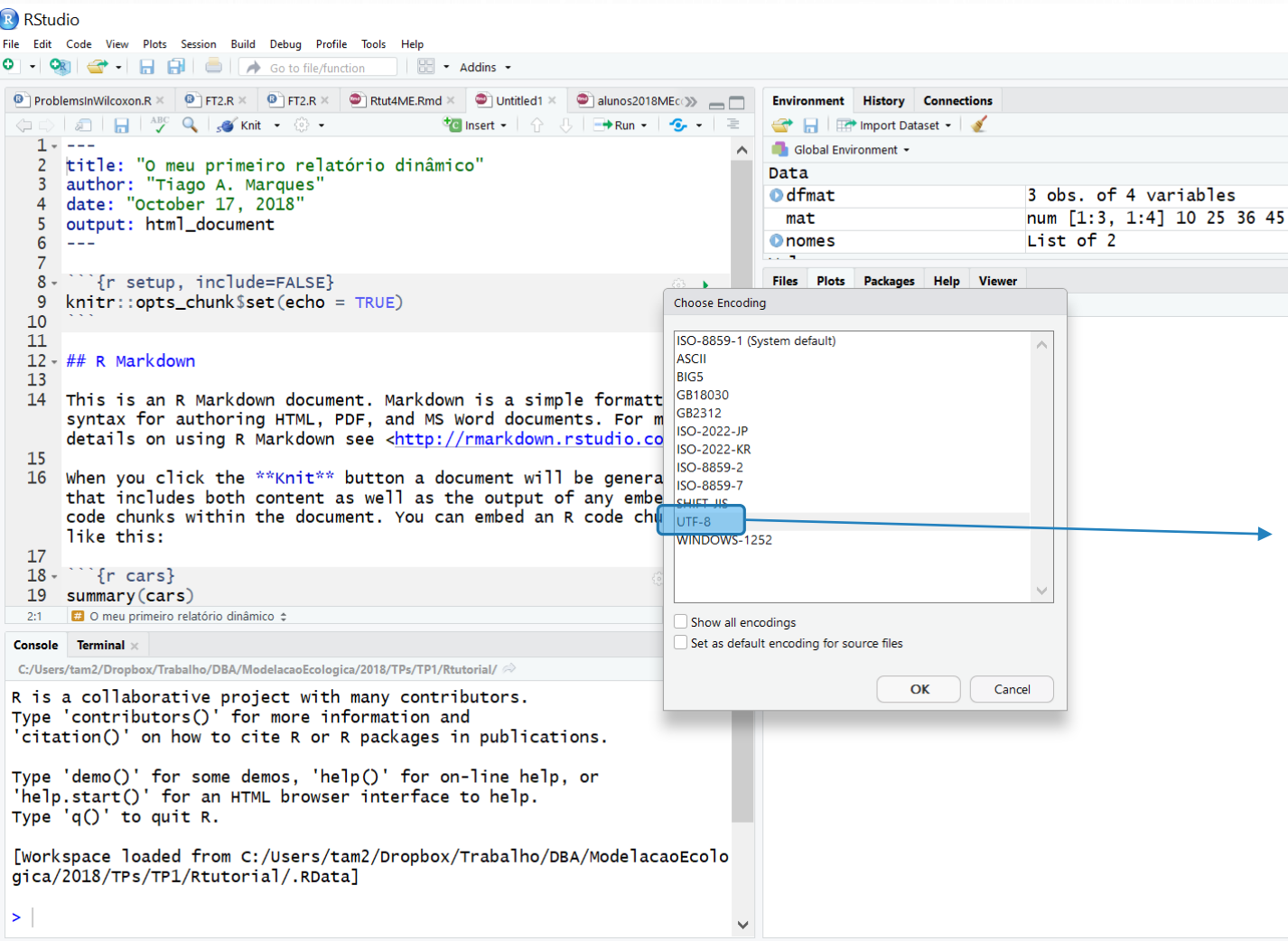
VAMOS CRIAR UM RELATÓRIO DINÂMICO



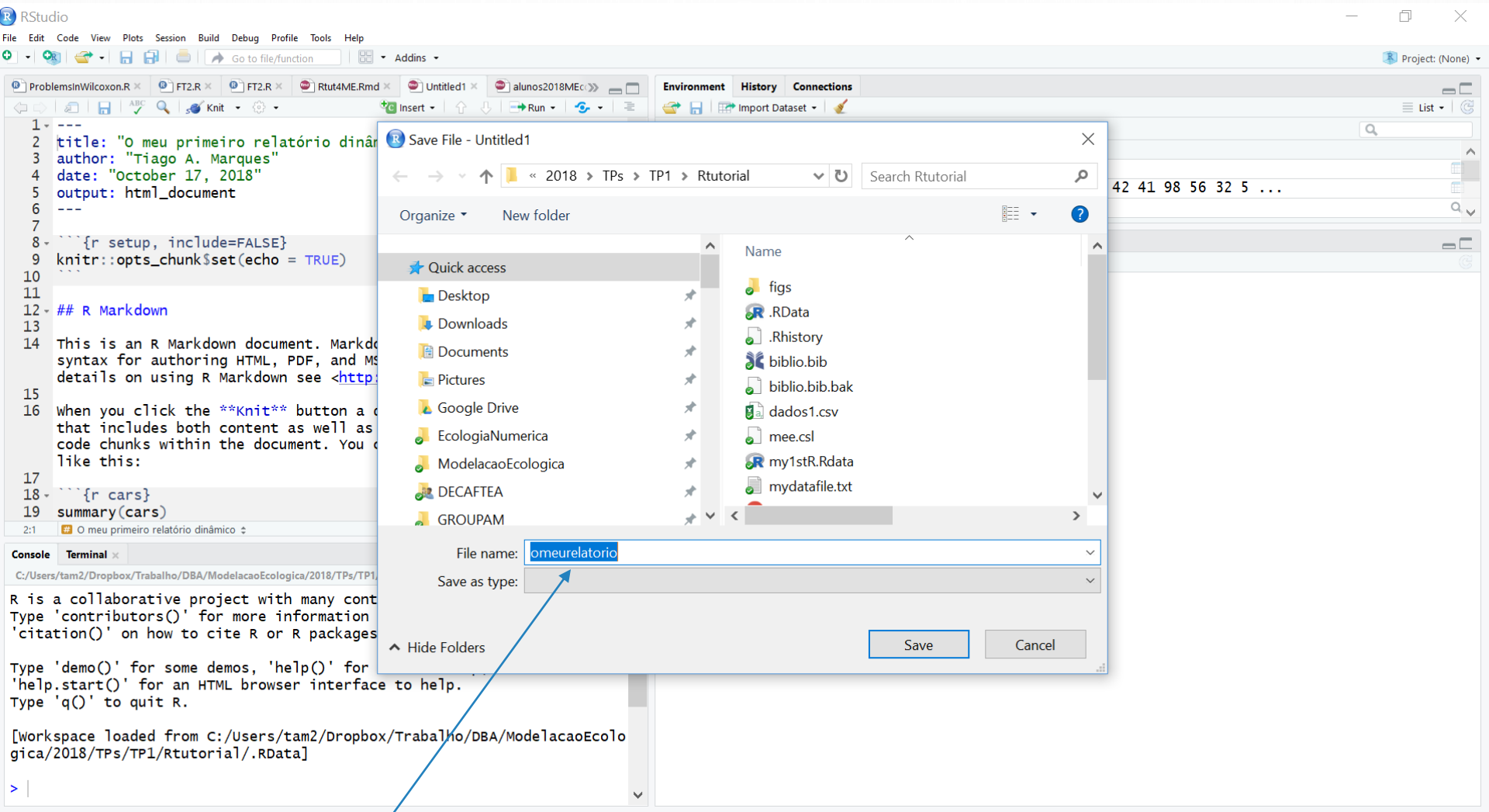

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
Project: (None)
ProblemsInWilcoxon.R
FT2.R
FT2.R
Rtut4ME.Rmd
alunos2018MEco.Rmd
Knit
Insert
Run
404 mydata<-iris
405 mydata$total<-mydata$Sepal.Length+mydata$Sepal.Width+
406 mydata$Petal.Length+mydata$Petal.Width
407 ```
408
409 Now, we are going to export this data set as a txt, named
`mydatafile.txt`
410
411 ```{r}
412 write.table(mydata,file="mydatafile.txt",row.names=F
413 ```
414
415 Note the use of the optional argument `row.names=FAL
otherwise some arbitrary row names would be added to
you look in the folder you are working in, you shoul
new file there. Open it and check that it looks as y
expect. Next, we are going to import it back into R,
object named `indat`.
416
417 ```{r}
418 indat<-read.table(file="mydatafile.txt",header=TRUE)
419 ```
420
421 So now we have our data back in R.
632:165
Programing tricks
Console
Terminal
C:/Users/tam2/Dropbox/Trabalho/DBA/ModelacaoEcologica/2018/TPs/TP1/Rtutorial/
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
[Workspace loaded from C:/Users/tam2/Dropbox/Trabalho/DBA/ModelacaoEcolo
gica/2018/TPs/TP1/Rtutorial/.RData]
>
Environment
History
Connections
Import Dataset
List
Global Environment
Data
dfmat 3 obs. of 4 variables
mat num [1:3, 1:4] 10 25 36 45 42 41 98 56 32 5 ...
nomes List of 2
New R Markdown
Document
Presentation
Shiny
From Template
Title: O meu primeiro relatório dinâmico
Author: Tiago A. Marques
Default Output Format:
HTML
Recommended format for authoring (you can switch to PDF or
Word output anytime).
PDF
PDF output requires TeX (MiKTeX on Windows, MacTeX 2013+
on OS X, TeX Live 2013+ on Linux).
Word
Previewing Word documents requires an installation of MS
Word (or Libre/Open Office on Linux).
OK
Cancel

R MARKDOWN AND DYNAMIC REPORTS

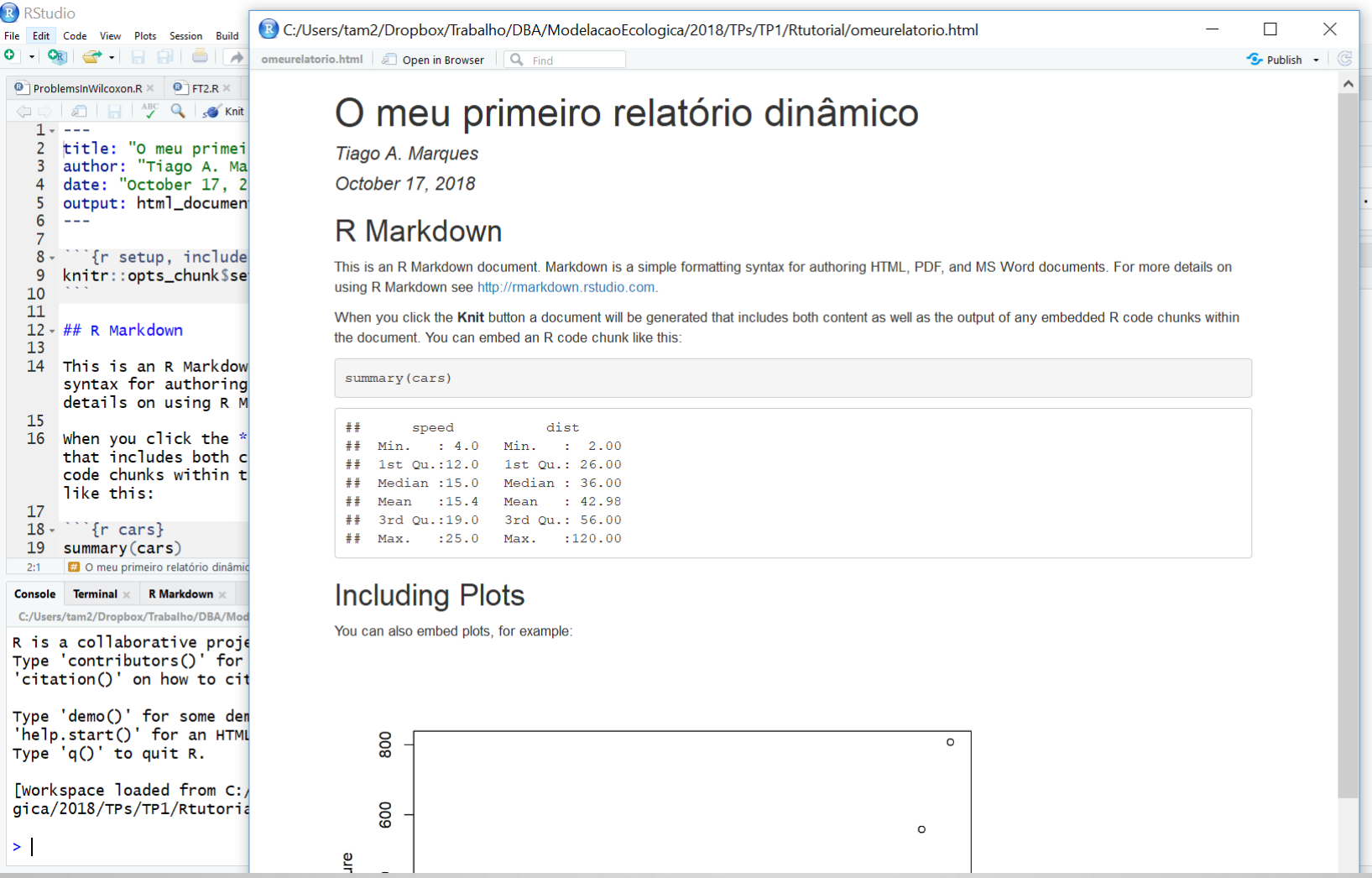




Para poderem usar caracteres portugueses (tipo ~,ç,õ)

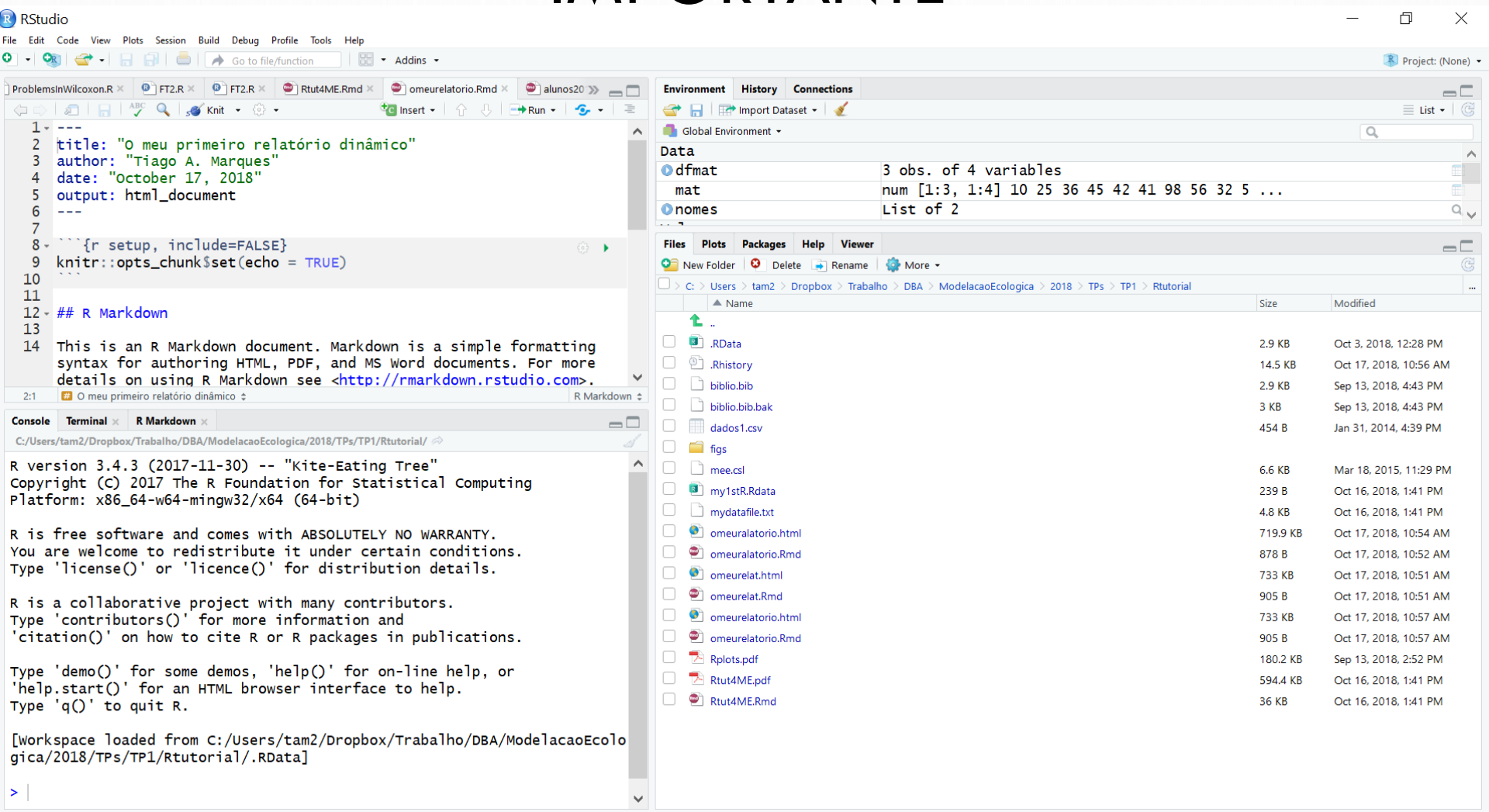


Definir o nome e onde querem guardar o vosso relatório



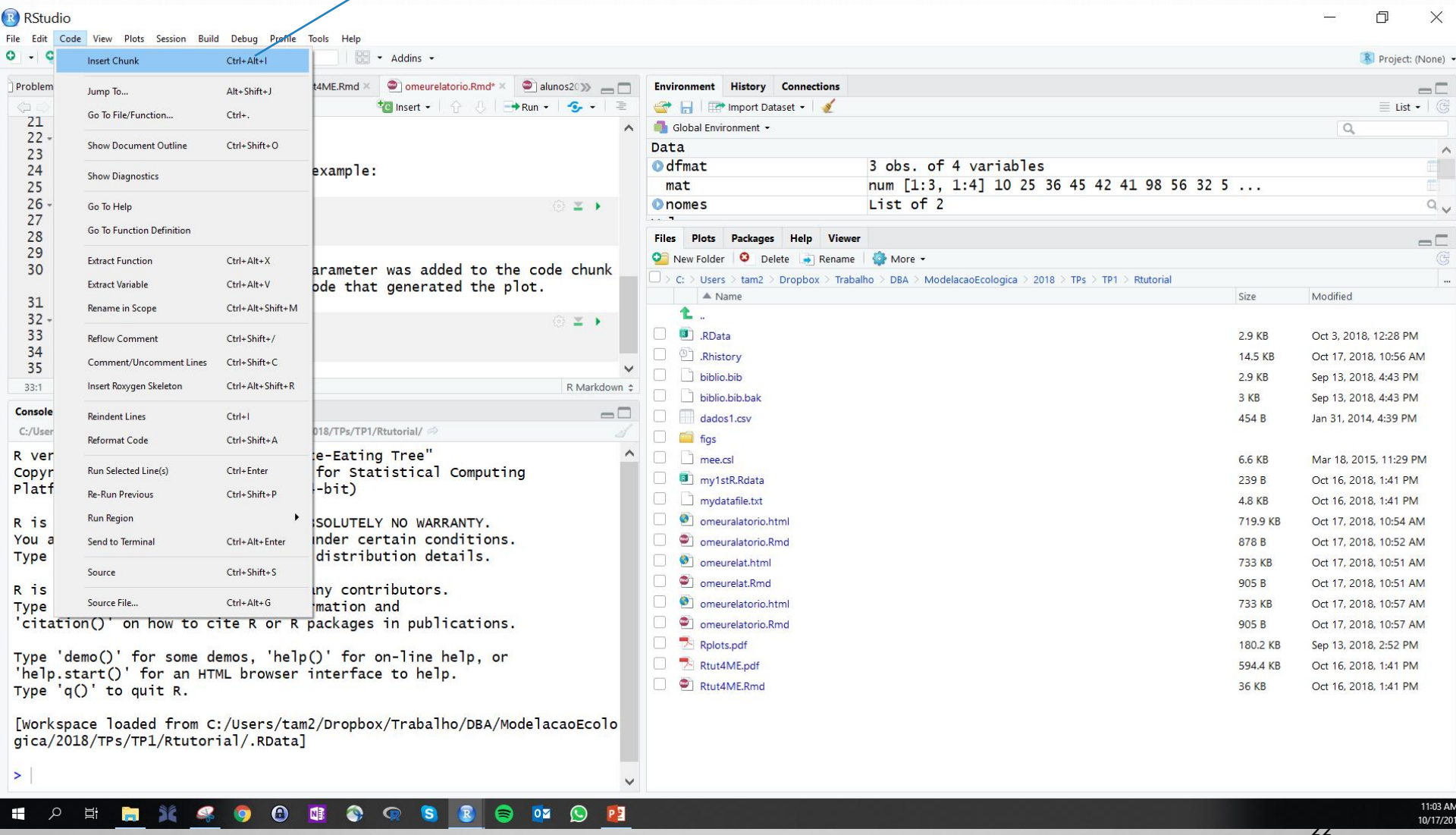
E cá está ele! O vosso primeiro HTML criado automaticamente ao compilarem o ficheiro omeurelatorio.Rmd. Na realidade, é possivel criar outputs em pdf e word (mas o pdf implica software adicional – latex - e o word às vezes não corre bem – usar por vossa conta e risco!)

IMPORTANTE

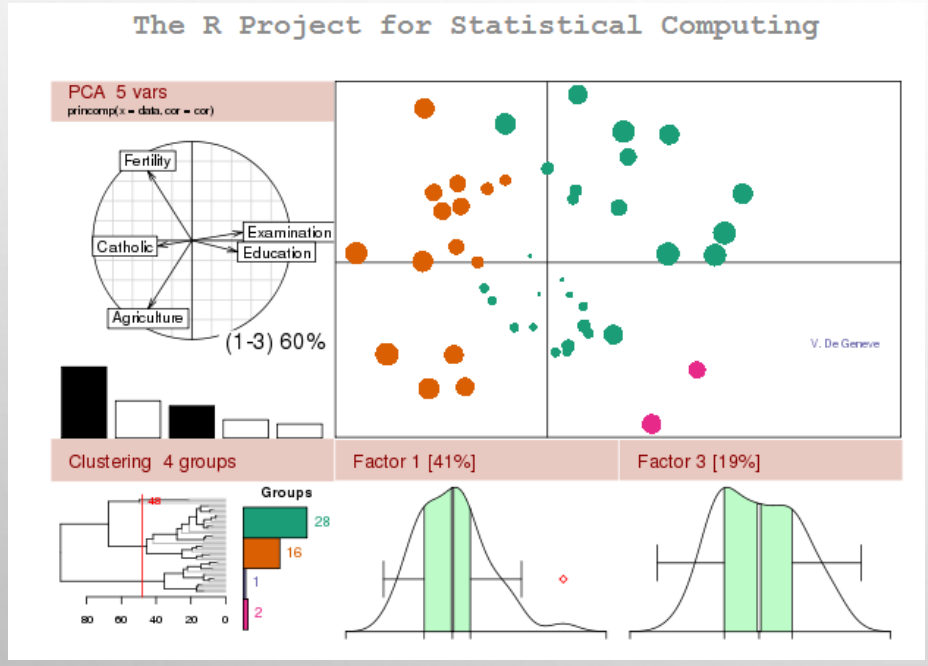


O que é executado na linha de comandos é independente do que está no relatório dinâmico (no .Rmd). Um .RMD não é um script usual, tem codigo e texto. O Código está sempre, sempre, sempre dentro de um code chuck!

Como inserir um novo “code chunck”



NOW... OPEN THE HANDS ON TUTORIAL



A hands-on tutorial on R and R Studio

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Tiago A. Marques

September 18, 2019

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