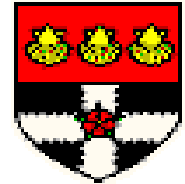


Data analysis methods in weather and climate research

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Overview of R statistical language

- Brief history
- Why use R?
- The RCLIM project
- Demonstration

Types of statistical software

- Statistical language-based software
e.g. Splus, R, SAS
- Interactive Spreadsheet-like packages e.g.
Minitab, SPSS, Excel
- Data analysis software with stat routines e.g.
MATLAB, PV-Wave, IDL
- Home made subroutines
e.g. numerical recipes, friend's code, etc.

Brief history of R language

- 1960s: AT&T develop data handling language (S)
- 1970s: S gets updated and sold as Splus
- 1980s: Freeware version R developed from old S
- 1990s: Splus and R get widely used by statisticians
- 2000-: R starts to get more widely used e.g. by university statistics departments

Why use R?

- It's one of the most powerful high-level languages for doing statistical analysis
- It has built-in functions and contributed libraries that can do most modern statistical methods
- It allows you to learn up-to-date statistical practices from its comprehensive online help
- It enables you to communicate easily with statisticians
- It runs on most operating systems (UNIX, PC, Mac)
- It is freely available – 26Mb download from:

www.r-project.org

The RCLIM project

R is often faster and more accurate than many of the commercial packages such as MATLAB and IDL. However, it has a few areas that need improving for it to be able to do climate analysis:

- read/write large gridded fields in netcdf format
- do nice geographical contour maps
- do climate analysis at many grid points

The RCLIM project started in Reading in 2005 has started to write code to address these gaps. An RCLIM webpage will appear soon here:

www.reading.met.ac.uk/cag/rclim

Some useful commands

```
> # The # symbol starts a comment statement
> help.start()      # launches help pages in browser
> q()               # quit R - save workspace saves all objs
> ?command         # gives help page on "command"
> command          # lists the function "command"
> read.table("file.txt") # reads in multicolmn tabbed data
> summary(x)       # summarises data object x
> dims(x)          # gives dimensions of array x
> new<-command     # puts output of command into new
```

Now for a live demonstration!

- The heights of Norwegian students
- Sampling the population (what is your height?)
- Exploratory Data Analysis
- Comparison with Reading students