MAS115 On Using RStudio (based on Version 0.98.1049)

This document gives some details about the facilities on offer in RStudio (as seen by a Windows user). Because there is often more than one way of achieving a goal in RStudio, we have offered you informed choice, ie we have listed the alternatives so that you can choose the one you prefer in a particular context.

If you launch RStudio in the normal way, eg by double-clicking its icon you will typically be presented with four windows whose functions are summarised in Fig. 1:

Fig. 1

An editor that will typically contain R code, provided some has been loaded. You can click on tabs to select from multiple scripts.	**Environment** pane has a listing of objects (variables, vectors etc) that are currently loaded. **History** pane holds a database of commands entered into the console.
A console which will typically contain output from your R program, with or without echoing of the commands used in that program. Individual R commands can also be entered and run here.	Panes for **Files, Plots, Packages** and **Help**

Opening a file in RStudio
From within RStudio there are various options for loading a .R file into the editor :
   a) Use >*File > Open File …* and navigate to your file.
   b) Click the **Files** tab of the lower right window, navigate to your file and click on it. [Navigation aids are '..' to take you to a parent folder, or '…' to allow folder selection, or you could use the breadcrumbs track.]
   c) If it is a recently used file, retrieve it using >*File > Recent Files*.

If you were outside Rstudio, you could tell your computer to always open files having extension .R with Rstudio. [This is known as associating .R files with RStudio.] Then simply double-clicking a .R file will take you into RStudio with that file loaded into the editor. An advantage of doing this is that the directory holding the file will automatically be displayed in the **Files** pane of the lower right window, allowing you easy loading by clicking other .R files in that directory. Moreover that directory will automatically become the working directory (about which more later).

Running R code

Clicking the **Run** icon at the upper right of the editor will run the current line of code or the highlighted selection.

To run the whole program, options are:
   a) First select all lines and then use the **Run** icon
   b) Use the keyboard shortcut **Ctrl Alt R**
   c) Use menu *>Code > Run Region > Run all*

Fig. 2 gives a snapshot of RStudio after an example program, Session1.R, has been run:
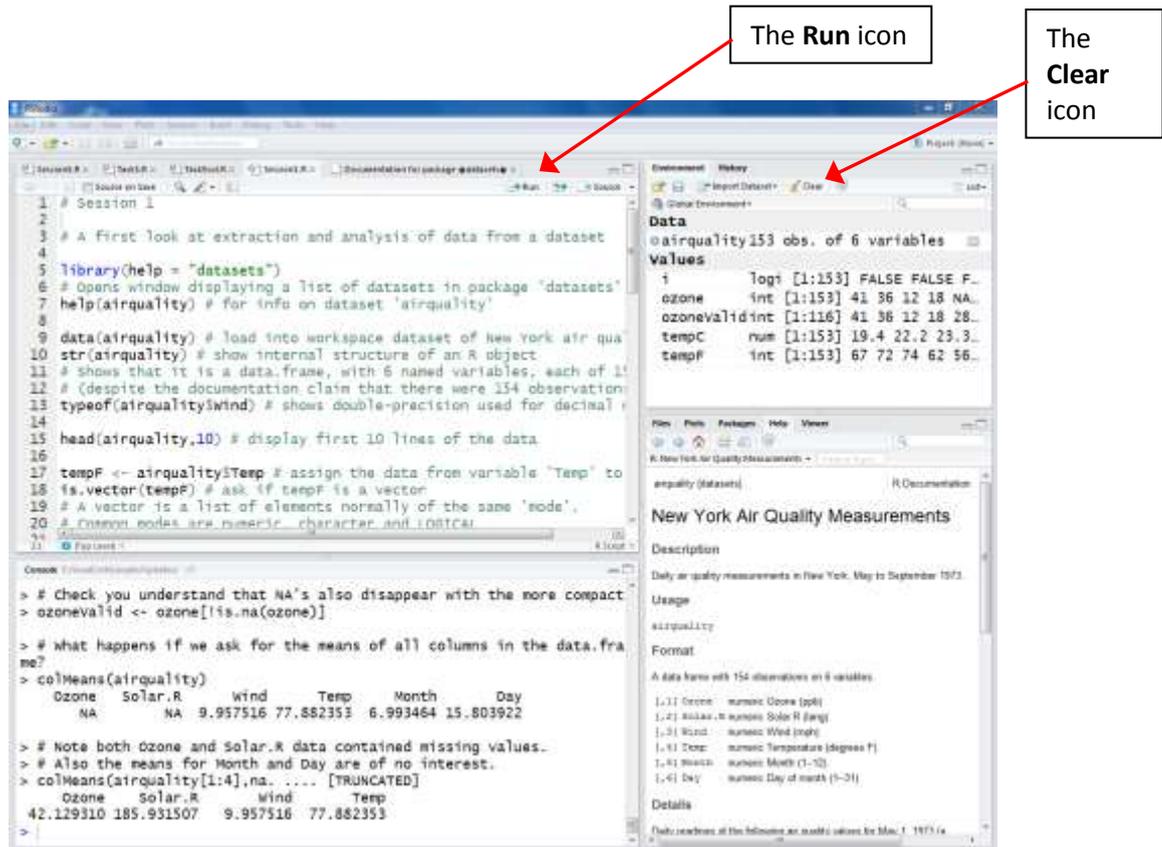
Notice that the output of the program appears in the **Console** window at lower left.

The default is that the commands used in the program are echoed in the console immediately before the output they generate. To change this, see notes on **Source** in the **Miscellaneous tips** section.

In the upper right window, on the **Environment** pane there is a useful summary of the objects (variables, vectors etc.) that have been created in the workspace by the program. When you quit RStudio (with *>File>Exit* or simply by closing the RStudio window), you will be asked whether you want to save these objects in the workspace.   Typically the answer would be 'No', because they can easily be recreated by re-running the program. The **Environment** pane is very useful in confirming (or not) that you have created the objects you intended to create. Sometimes a program won't run as you expect because you have unwittingly left values in a certain variable. If you get stuck, you can clear all objects from the workspace with the **Clear** icon at the top of the window.

The bottom right window has the **Help** pane active to display help on the dataset 'AirQuality', as requested by the program.

The Working Directory

The *working directory* is the default path used when you load or save an R script or give R commands to load data from or save data to a file.

To set the working directory, you can use *>Session > Set Working Directory* and select an appropriate folder. Notice that when you do this the command

>   **setwd**(<path and name of directory>)

will be echoed in the **Console** window. Note the forward slashes in the command.

Should you wish, you could embed this command in your .R program for use on a later occasion. Another option for setting the working directory is to go the **Files** pane at the lower right and click the **More** drop-down menu.

If .R files have previously been linked to open with RStudio, then loading the file by double-clicking will cause the working directory to be set automatically to the location of the file.

If you are ever unsure what your current working directory is, note that it is displayed at the top of the Console window (see Fig. 3). Also, if you click on the curved arrow icon next to it, the directory will be displayed in the Files tab of the bottom right window.

Fig. 3
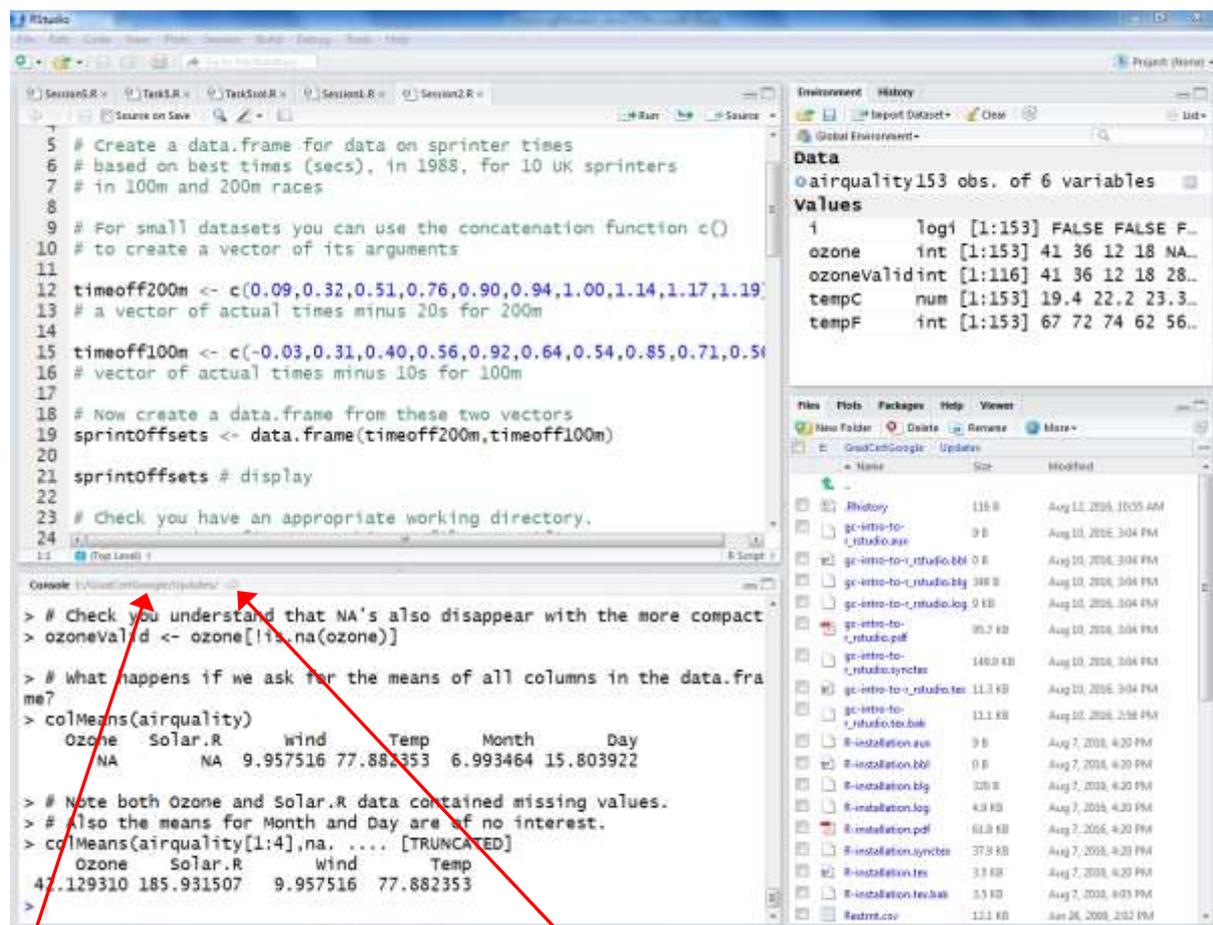
Current Working Directory

Click curved arrow icon to display working directory in the Files pane.

Panes in the lower right window
The **Files** pane has already been introduced, but see Fig. 4 for some tips on navigation in this pane.

The **Plots** pane displays plots generated by an R program. These plots can be saved in various forms from here, using the **Export** drop-down menu. If you select **Save as Image …** you get a choice of image formats, eg PNG or JPEG. Arrow icons allow you to move backwards and forwards through your plot. Use the icon **Clear All** to clear all the plots.

The **Packages** pane allows you to see what packages are currently installed. If you select the tab for this pane, and then click the *datasets* package, you will see in the **Help** pane a list of the datasets that are packaged with R. Click on one of these datasets to see information about it. Left and right arrows allow you to move back and forth among displayed help pages.

In the **Help** pane it is possible to search for help on a topic by typing its name into the search field at the top right. You can also search within a topic. Navigation between documents is facilitated by a drop-down menu and backwards and forwards arrow icons.

One word of warning: when looking for help it is easy to waste time by wandering around in labyrinths of R information which you don't need to know. Don't fall into this trap. Remember that you can look for answers to specific queries on programmers' websites such as *stackoverflow.com*.

Clearing the decks
To begin typing a new R program into the editor, use *File > New File > R script*.
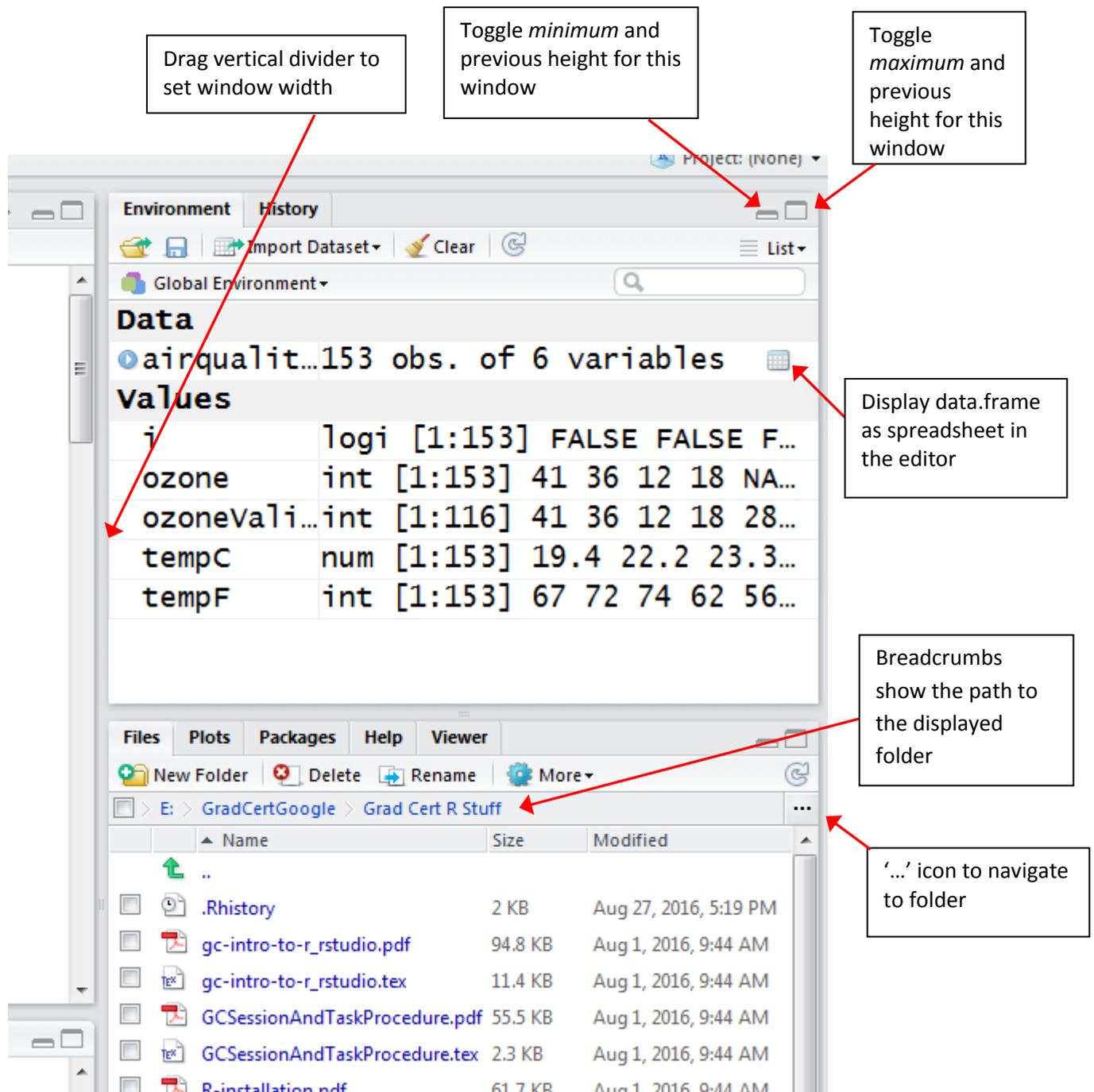If you want to clear old output from the console, use *Edit > Clear Console*.
If at any time you want to remove all pre-existing objects from the workspace use the **Clear** icon in the **Environment** pane of the upper right window.

Miscellaneous tips
- If you want to comment/uncomment a block of text you can highlight the relevant lines and use *>Code > Comment/UncommentLines*.

- Should you be unhappy with the appearance of text when you print off programs or output from RStudio, you can temporarily change parameters via *>Tools>Global options* … and then on the *Appearance* tab choose eg Lucida Console font, with size of 14pt.

- At the top right of the script editor window there is a drop-down menu **Source**. You can use this to control whether you want all the code in the editor to have its commands echoed in the console just before they are executed. Try putting the commands **print("test1")** and **print("test2")** into a blank script window and then click the **Source** icon, without using the drop-down menu. The default is *Source with echo*, which is appropriate if you want both command and output in the console. If you want just the output, then use the drop-down menu and click on the top item **Source**. Clicking just the icon **Source** will use the most recent choice of with/without echo selected from the menu.

- Some features that you may want to exploit are pointed out in Fig. 4 below.

Fig. 4   A snapshot of the upper quarter of the RStudio window, with useful features pointed out.

Drag vertical divider to set window width

Toggle *minimum* and previous height for this window

Toggle *maximum* and previous height for this window

Display data.frame as spreadsheet in the editor

Breadcrumbs show the path to the displayed folder

'…' icon to navigate to folder

This document does not provide an exhaustive list of RStudio's features, but we hope that it will have given you enough information to get you into good habits when dealing with R.

As with any software, a little time spent now familiarising yourself with RStudio can save you a lot of time later on. Also, as you use the software, you will no doubt discover for yourselves various useful tricks to make you even more efficient.