R workshop preparation instructions

Dan Moore Kevin Shook Paul Whitfield

June 5, 2022

Welcome!

Thank you for attending the CSHS Workshop: **R for hydrologists**. The workshop will be interactive and will consist of the following sessions:

Morning
Introduction to R - Kevin Shook

Coffee break

Working with **CSHShydRology** - Paul Whitfield
==========
Lunch (not provided)
==========
Afternoon
Catchment delineation - Dan Moore

Coffee break

Functions, projects and packages - Kevin Shook
Creating documents in RMarkdown - Dan Moore

Setup instructions

As this is a workshop, you will need a laptop with **R** and **Rstudio** pre-installed. We won't have time to help you with the installation, so please make sure that your system is working ahead of time. This is especially important if you have a computer from your employer - please talk to your IT people ahead of time to make sure that everything is installed correctly.

Installing R

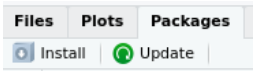
R needs to be installed first. You can get the program here: https://cran.r-project.org/index.html

Next, you need to install **RStudio**. You can get it from here: https://www.rstudio.com/products/rstudio/

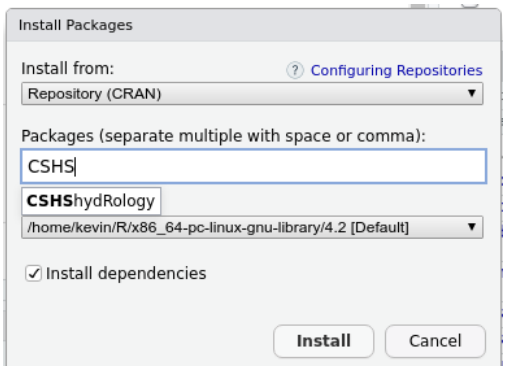
Please run **RStudio** *before* attending the workshop to be sure that everything is working properly.

Installing `CSHShydRology`

The Workshop is based on the `CSHShydRology` package, so you will need to have it installed ahead of time. You can do this inside **RStudio** by selecting the **Packages** tab and clicking the "Install" button.



Now type CSHShydrology into the dialog box. Make sure that the checkbox "Install dependencies" is selected and click the **Install** button.



`CSHShydRology` requires the use of the package `whitebox`. which also requires an executable program to be installed. You can do this inside **RStudio** with the following commands:

```
library(whitebox)
install_whitebox()
```

Other programs and packages

ggplot2

The package **ggplot2** is used very widely for graphs. We have a few exercises which use it, so it would be a good idea to install it. It is installed in the same as was `CSHShydRology`.

Rmarkdown

We will be using the package `rmarkdown` to create documents, so you should also install it. This allows you to create html documents. If you want to be able to export .pdf and .docx files, you will also need to install the program **Pandoc**
https://pandoc.org/installing.html and **LaTeX**. Note that the **Pandoc** installation page also shows where you can obtain **LaTeX** for your system.

git

git is a distributed version control program. We will be showing how to use **git** with **RStudio** to manage the versions of your files. You can install **git** from here:
https://git-scm.com/downloads

devtools

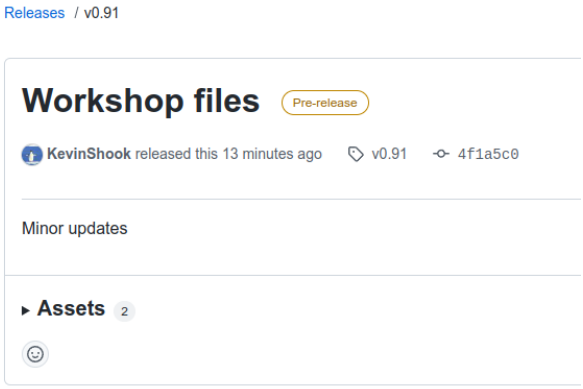
We will be showing how you can build packages in **R**, which requires installing the package `devtools`. Make sure that all the dependencies (there are many!) are installed.

Setting up your workspace

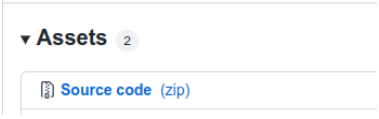
The data files needed for these exercises can all be downloaded from **GitHub**, at https://github.com/CSHS-CWRA/CWRA_2022_R_workshop. Note that to get the files you *must* have an account on **GitHub**, which is free.

To get the data, follow the steps below. Note that the files are subject to change (we are working on the content), so it's a good idea to check to see if the files have been updated.

1. Go to https://github.com/CSHS-CWRA/CWRA_2022_R_workshop/releases
   You will see the current version number of the files. In this case, it's version 0.91, which is a pre-release version. The version(s) used by the workshop will be >= 1.0.



2. Click on the triangle to the left of **Assets**
3. Under **Assets** click on **Source code (zip)**



4. Download the .zip file to a folder on your hard drive.
5. Extract the .zip file

This will create all of the folders that are required, with all of the data files that we will be using.

`/tutorials` - contains the tutorials that you will be working through
`/slides` - contains all the slide presentations
`/data` - contains all the data sets required to complete the exercises
`/output` - where your code will write output
`/figures` - where your code will save figures
`/preparation_instructions` - this document