Welcome to R!

Why use R?

What is it, and why are we using it? Well, in order to illustrate many of the modeling concepts in the course, and for you to build models and do data analysis of your own, we need a more powerful tool than Excel or a graphing calculator. We need a more general coding language. R, Matlab, Octave, Python ... any of these could work for our purposes, and many of you have probably heard of or worked with at least one of them. If not, that's ok!

Each language pros and cons (Python is the most versatile, R's learning curve is less steep and it's geared more toward statistical analsysis, etc.), but R's utility in data science in general, and the earth sciences in particular, is widely regarded, and many of the principles you learn here will extend to any other language you branch into in the future. Moreover, it's free, extremely easy to get up and running, and has a huge user base and library of tools for dealing with the kind of data and tasks often encountered in the earth sciences.

Help in learning R

1) **In-class sessions:** To help you get up to speed on coding fundamentals, and R in particular, we devote several of our in-class sessions exclusively to R. Please come to these with your laptops so you can work along.

2) **DataCamp's R courses:** Additionally, there's an excellent series of online R lessons and exercises through DataCamp (www.datacamp.com) that we encourage you to enroll in (the student rate is $9/month). While not required, the extra practice and reinforcement will be invaluable, especially if you haven't done much coding before. We take a slightly different order of topics in our in-class session than DataCamp's curriculum, but feel free to work through all of DataCamp's Intro and Intermediate R classes sequentially. You can sign up as part of the ES211 group by going to this link: https://www.datacamp.com/groups/dce45215e39cc8925bcb26696a0c9f64e0b517b8/invite

3) **`swirl`:** This is an R package (which also means it's free) that includes a bunch of exercises you can go through at your own pace. It's similar to DataCamp but doesn't require you to be online, and you can do all the exrcises right in your own R console.

4) **other** - There are many, many other online R courses and tutorials our there (Coursera's free R course is a very popular one), but if you prefer something in hardcopy, the R Cookbook from O'Reilly press is a good one.

Exercise!

Whichever supplemental material you prefer, the important thing is to be working through exercises on your own, for a couple reasons:

1) Coding is a learn-by-doing activity. We'll go through some code exercises together in class. DataCamp provides an excellent bevy of interactive tasks for you to go through on your own. Investing the effort in them will make your life much easier when it comes to the graded assignments.
2) Everybody learns differently, and you might find the in-class examples more intuitive than DataCamp's, or vice versa. We hope you'll give us your feeback on what clicked or didn't for you!

Also, we'll cover things in class that DataCamp and `swirl` do not. The tools you'll learn for making figures, and dealing with a special kind of spatial data called "rasters", are not found in the DataCamp courses.

What do do next:

1) Install R (cran.r-project.org).
2) Install Rstudio (www.rstudio.com). The standard installation of R (step 1, above) comes with a bare-bones interface in which to write code, send commands for R to execute, make plots, etc., but Rstudio provides a much cleaner and more versatile interface. Rstudio will automatically locate your R installation, so these two steps should just take a couple minutes.
3) Sign up for a monthly student membership to DataCamp (www.datacamp.com/enroll-student). You may opt out of this if you're already well versed in basic programming concepts, but even so, it's probably worth it to get a handle on R's idiosyncrasies. This class doesn't have a textbook, so consider the $18 it costs for two months of DataCamp membership your total, and very reasonable, cost for the course.
4) Come to class each day with your laptops, especially the R sessions.