Modelling and data analysis ‘Winter School’

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1 | Welcome & Introduction

Day 1

10:00	Arrival & welcome	Nick
10:15	Introduction to programming Navigating the command line environment, scripting vs programming, pros & cons of various languages	Nick
11:30	Introduction to models Climate model basics: components, types of models, internal variability. CMIP overview, climate sensitivity	Liz & Dan
13:00	Lunch	
14:00	Time-series data – lecture Principal component / empirical orthogonal function analysis, calculation of correlations, anomalies, detrending	Mario
15:30	Afternoon tea	
15:45	Time-series data – tutorial	Mario
17:00	Wrap-up	

Day 2

09:00	Spatial data – lecture Understanding gridded data, map projections, data analysis and manipulations, masking, extracting vertical / horizontal sections	Alex & Alena
10:30	Coffee	
10:45	Spatial data – tutorial	Alex & Alena
12:15	Lunch	
13:15	Document preparation in LaTeX Learn the basics, write equations, insert figures, create your own tables, insert references	Angela
14:45	Afternoon tea	
15:00	Work Structure & Version control Defining a workflow, handling ‘big data’, version control for scripts/documents, best practice guidelines	Stefan

1 | Aims, Methods, & Scope

- The **aim** of the Winter School is that, by the end of the two days, participants will be able to find and download (climate model) data of interest, use simple scripts to process, analyse, and plot those data, integrate these outputs into a typeset document, and use version control software to keep track of changes.

- We will use ***Python*** for the majority of the work but will incoporate examples from other languages if necessary. We'll introduce you to packages like LaTeXand tools such as *github*.

- This workshop is only intended to provide an **introduction** to working in a command-line environment, and exposure to some of the functionality available in this realm. It is not intended to be a complete course on programming, modelling, or data analysis ;-)

2 | Command-line basics (*nix)

Basic commands

command	example	description
ls	`ls -ltrh`	list directory contents (in long format, newest last)
cd	`cd ../mydir/mysubdir`	change directory (up one level, down two)
rm	`rm delete-this.txt and-all-these.*`	remove file(s)
mv	`mv rename-this.txt to-this.txt`	move (rename) file(s)
mkdir	`mkdir ./new-directory`	make a new (empty) directory
cp	`cp this.txt ./new-dir/to-this.txt`	copy file (possibly to new location)

Linux c-line tools

tool	example	description
pwd	`pwd`	Find out what your current personal working directory is
sed	`sed -e 's/a/b/g'`	stream editor, swap 'a' for 'b'
awk	`awk '{print $2, $3}'`	print fields 2 & 3 from file/stream

Other packages & utilities

package	example	description
pdflatex	`pdflatex myfile.tex`	compile LaTeXdocument
git	`git clone golledni/WinterSchool`	Make a local copy of a github repository