

# Modelling and data analysis 'Winter School'

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**Antarctic  
Science Platform**  
National Modelling Hub



**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
HĪKINA WHAKATUTUKI



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Te Hōu Nukurangi

# 1 | Welcome & Introduction

## Day 1

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

## Day 2

09:00	Spatial data – lecture	Alex & Alena
	Understanding gridded data, map projections, data analysis and manipulations, masking, extracting vertical / horizontal sections	
10:30	Coffee	
10:45	Spatial data – tutorial	Alex & Alena
12:15	Lunch	
13:15	Document preparation in L <sup>A</sup> T <sub>E</sub> X	Angela
	Learn the basics, write equations, insert figures, create your own tables, insert references	
14:45	Afternoon tea	
15:00	Work Structure & Version control	Stefan
	Defining a workflow, handling 'big data', version control for scripts/documents, best practice guidelines	

# 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 incorporate examples from other languages if necessary. We'll introduce you to packages like  $\text{\LaTeX}$  and 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

<code>ls</code>	<code>ls -ltrh</code>	<u>l</u> ist directory contents (in long format, newest last)
<code>cd</code>	<code>cd ../mydir/mysubdir</code>	<u>c</u> hange <u>d</u> irectory (up one level, down two)

### Linux c-line tools

<code>sed</code>	<code>sed -e 's/a/b/g'</code>	s <u>t</u> ream <u>e</u> ditor, swap 'a' for 'b'
<code>awk</code>	<code>awk '{print \$2, \$3}'</code>	print fields 2 & 3 from file/stream

### Other packages & utilities

<code>pdflatex</code>	<code>pdflatex myfile.tex</code>	compile L <sup>A</sup> T <sub>E</sub> X document
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