

Pre-Lab 1: Environmental Data Sets

Pre-Lab Overview

Many climate data sets are freely available online, but finding them and understanding the way the data is organized can be difficult. In this pre-lab assignment you will:

1. Find a climate data set online.
2. Examine the data format and the metadata.
3. Learn about functions in MATLAB
4. Fill in the pre-lab worksheet.

As you explore some of the websites given below, you will need to do some browsing until you understand the layout and structure of the website - once you have done this you will be in a position to download and understand a data set.

Please bring your chosen data set with you to lab in the form of a text file. You can bring it on a USB stick, email it to yourself, or use an online repository like 'Dropbox'. You will use this data in the lab.

We have also included a short reading section entitled *MATLAB Skills* to introduce some of the skills you will learn this week. You do *not* require access to MATLAB to do complete this part.

To Hand In

1. Pre-lab worksheet

1. Find a climate data set

You will search for and download a data set from one of the websites below. The data you find should be a climate time series: data that varies in time but *not in space*. That is, all measurements in your data set should be taken over a span of time at the same location.

A time series consists of a series of dates and a corresponding series of measurements. Examples of a time series include *Temperatures at YVR Airport between 1950 and 2000*, or *Tidal Heights at Jericho Beach on December 31, 2012*, and so on.

Please ensure that the time series you choose consists of at least ten measurements, but most climate data sets consist of many more, usually thousands of measurements. When you download the data set, it should be a text file with a file extension like *.txt*, *.dat*, or *.csv*. Avoid all gridded data or image data.

Please download a data set from one of the following websites:

- Environment Canada National Climate Data and Information Archive
http://climate.weather.gc.ca/historical_data/search_historic_data_e.html
- NOAA National Oceanographic Data Center Heat Content
http://www.nodc.noaa.gov/OC5/3M_HEAT_CONTENT/basin_data.html

2. Find metadata for the data set

A text file full of numbers is not very useful without information about the format used to store the data. This information is called *metadata*: data that describes other data.

For the data you have selected, find the metadata that describes the data. Often this information is on the web page the data file is linked from, or it may be contained in the header of the data file itself. You will likely have to search around a little bit; remember, the *goal* is for you to understand the data set you just downloaded. You will require the metadata to complete the pre-lab worksheet.

3. MATLAB Skills: Functions

You have already used some MATLAB functions. The calls `plot()`, `sin()`, `rand()`, and `xlabel()` are all function calls: they perform predetermined calculations or actions. In general, a function requires an *input argument* and returns an *output*. However, not all functions require an input, and some don't return an output. In the call

```
>> y=sin(x)
```

the input argument to the `sin` function is the vector `x`, and the output is the vector `y`. Likewise, in the call

```
>> xlabel('Time')
```

the input argument is the *string* `'Time'` and no output is required. Arguments and returns can be of any format (*string, integer, matrix, ...*) depending on the purpose of the function.

4. Fill out the Pre-Lab Worksheet

This is available to you on the *Canvas* website.