ASSIGNMENT 1. ORGANIZING TIME SERIES DATA IN MATLAB© STRUCTURES

1. Following the instructions in the notes, select your three sets of time series and put them into time series matrices. Save the matrices in `xls` files. Likewise write and store ASCII `txt` files with metadata on the time series. Each of the required data sets (V1, V2 and V3) should have a time series matrix and corresponding `txt` file.
2. Run geosa1.m, which reads the time series matrices and `txt` files and stores all data in a single `mat` storage file.
3. If geosa1 ran successfully, you end up with three Matlab figure windows. Put those figures with captions in a `pdf` document. (see `appendixb.pdf`)
4. In the captions to figures 1, 3 and 3 describe the sets of time series and why you selected these particular series as your output, or response, variables (V1), input variables (V2), and trend-example variables (V3).
5. Zip together the following files into a file `smith1.zip` – except with your last name in place of "smith":
    a. `smith1.pdf`
    b. the 3 `xls` files with your time series matrices
    c. the 3 corresponding `txt` files with the metadata
    d. the `mat` output file that was created when you ran `geosa1.m`
6. Email the zipped file to me as an attachment.

BREVITY. As a rule of thumb for this assignment and other assignments in the course, keep each figure-caption to 100-200. Often fewer than 100 words will suffice, and sometimes short sentence is adequate. Using arrows and text annotation from the Figure window can often reduce the need for text in the caption.

Running goesa1.m

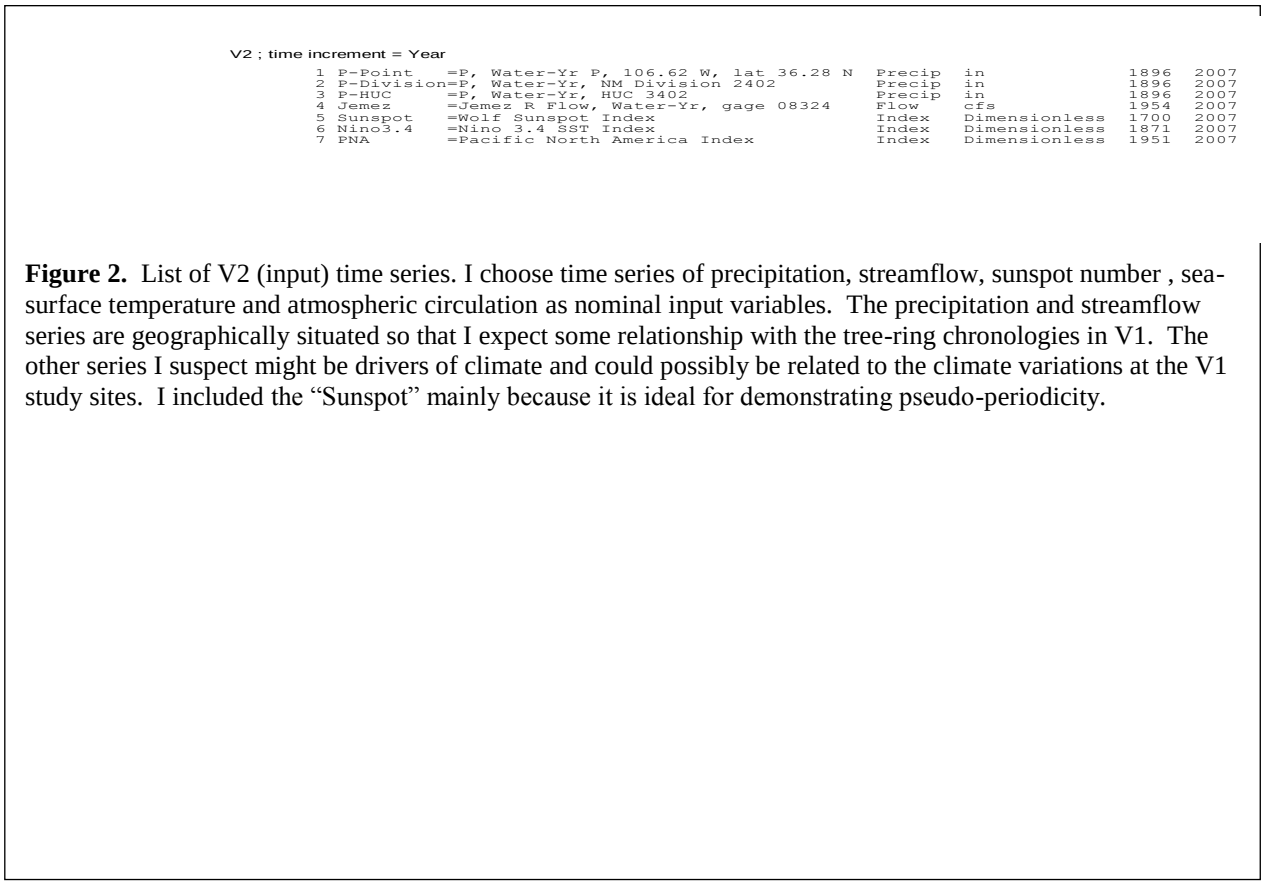
As an example, I use the name "smith" below for file naming. You would replace that with your own last name.

1. >geosa1
2. Message box introduces geosa1. Click OK to proceed.
3. Respond to menu -- "**Select Type of Data or Quit**". Here you select which time series you want to organize, starting with V1.
4. Click/open the desired `txt` file with metadata file in the file window
5. Text information about your data file appears in the command window. Respond to the menu question on whether that data information looks OK. If not, click abort and go back and correct the problem.
6. A message box appears listing the series labels read from row 1 of your `xls` file and comparing them with the labels used in your `txt` files. Click OK to close this message box.
7. A question box asks if "Order is OK?". If the series names matched properly in the previous window, click Yes. If not click No and make necessary changes.
8. File window appears. Asks you to specify (click on or enter name of) the output file that is to hold your time series structures. Respond by entering "smith11" -- using your name instead of "smith".
9. Message appears depending on whether you have already created the mat storage file: If just starting, says that `smith11.mat` has not yet been created and that you will create it and store V1 there. If `smith11.mat` already exists (for example, if you have already stored V1 there), a message box tells you that the file already exists and asks if you want to store V2 or V3 there. Because the idea is to get data-types V1, V2, and V3 in smith11.mat, the answer is usually YES.
10. A message window appears informing about the present status of the time series structure (V1, V2 or V3) in the output .mat file. Click OK.
11. A menu appears asking whether to continue with saving the output file or to abort. Usually, click continue.
12. The menu (see #3 above) re-appears. You may choose to quit now, or to enter another data type (e.g., V2 or V3). Then repeat steps 4-11.
13. When you have finished selecting V1, V2 and V3, three figure windows appear.
14. The three windows summarize data types V1, V2, V3. These figure windows with captions answering the questions in the assignment will be submitted in a `pdf` file (see `appendixb.pdf`). A menu also appears prompting you either to quit, or select another data set for adding to the `mat` file. The usual sequence is to do the V1 series, then the V2, then the V3, then quit. But you can do this in any order, and do not need to organize all three series at the same time. If you click on another data type (V1, V2, or V3), your will be back at step (3) above. If you elect to Quit, you will do step 11 below.
15. The script geosa1 ends, leaving the three figure windows. Sample output with captions are shown below.

Sample output

```
V1 ; time increment = Year
        1 MEAF-PSME=Mesa Alta Fir PSME, standard index      Index  Dimensionless  1658  2007
        2 MEAP-PIST=Mesa Alta Pine PIST, standard index     Index  Dimensionless  1658  2007
        3 BCWF-PSME=Bear Can W Fir PSME, standard index     Index  Dimensionless  1658  2007
        4 BCWP-PIST=Bear Can W Pine PIST, standard index    Index  Dimensionless  1658  2007
        5 FEN-PIPO =Fenton Lake PIPO, standard index        Index  Dimensionless  1658  2007
        6 EAU-PSME =Echo Amphitheater PSME, standard index  Index  Dimensionless  1658  2007
```

Figure 1. List of V1 (output) time series. I choose a set of 6 tree-ring standard chronologies. These data are part of a set assembled by Connie Woodhouse, Ramzi Touchan and Dave Meko for studies of long-term hydroclimatic variability in the Rio Grande River Basin. They are nominally considered as output variables in a system with climate as input.



V2 ; time increment = Year

1	P-Point	=P, Water-Yr P, 106.62 W, lat 36.28 N	Precip	in		1896	2007
2	P-Division	=P, Water-Yr, NM Division 2402	Precip	in		1896	2007
3	P-HUC	=P, Water-Yr, HUC 3402	Precip	in		1896	2007
4	Jemez	=Jemez R Flow, Water-Yr, gage 08324	Flow	cfs		1954	2007
5	Sunspot	=Wolf Sunspot Index	Index	Dimensionless		1700	2007
6	Nino3.4	=Nino 3.4 SST Index	Index	Dimensionless		1871	2007
7	PNA	=Pacific North America Index	Index	Dimensionless		1951	2007

Figure 2. List of V2 (input) time series. I choose time series of precipitation, streamflow, sunspot number , sea-surface temperature and atmospheric circulation as nominal input variables. The precipitation and streamflow series are geographically situated so that I expect some relationship with the tree-ring chronologies in V1. The other series I suspect might be drivers of climate and could possibly be related to the climate variations at the V1 study sites. I included the "Sunspot" mainly because it is ideal for demonstrating pseudo-periodicity.

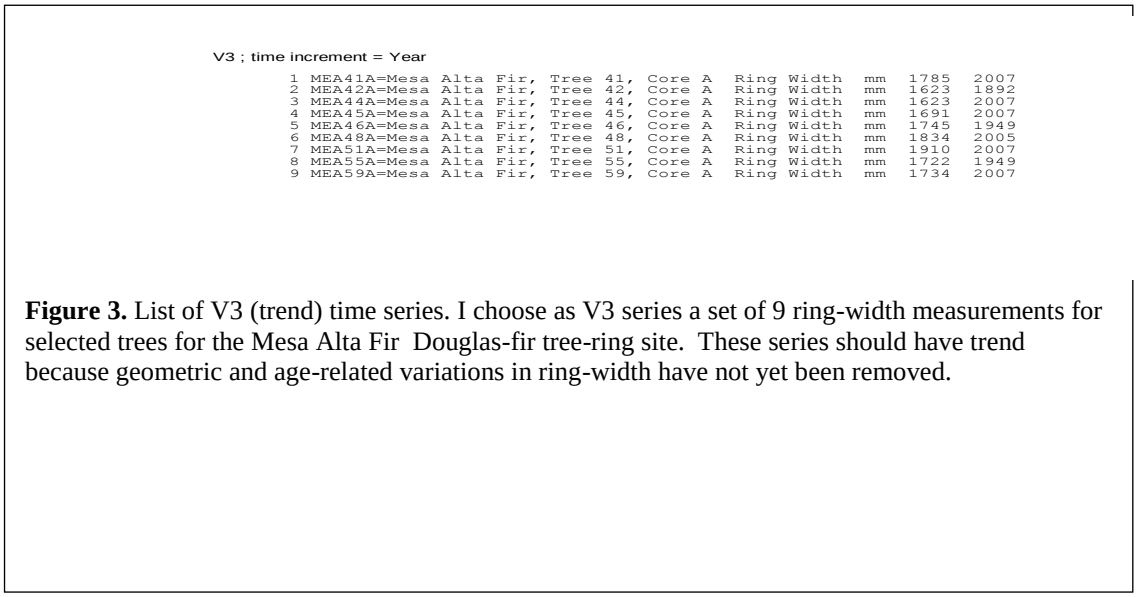


Figure 3. List of V3 (trend) time series. I choose as V3 series a set of 9 ring-width measurements for selected trees for the Mesa Alta Fir Douglas-fir tree-ring site. These series should have trend because geometric and age-related variations in ring-width have not yet been removed.