

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. Copy those figure windows into text boxes in a MS Word document. Within MS Word add captions (see appendixb.pdf).
4. Save the MS word document with a .doc file whose filename is made up of your last name and the assignment number (e.g., meko1.doc). In the captions to each figure answer the questions below.
5. (Caption to Fig 1). Why did you select these time series for your response variables?
6. (Caption to Fig 2). Why did you select these time series for your input variables?
7. (Caption to Fig 3). Why did you select these time series for your “trendy” time series?
8. Zip together the following files into meko1.zip, with your last name replacing “meko”:
 - a. meko1.doc
 - 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
9. 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 geosa1.m

1. >geosa1
2. Message box introduces geosa1. Click OK to proceed.
3. Respond to menu -- do you want to organize V1, V2, or V3 time series now?
4. Click/open the desired .txt 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 the 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 a filename or clicking on a file. I use "spring09.mat" for the class demo file, so do not use that. I suggest your name with the year. For example, if your name is Jones, use jones09.mat
9. A message window may appear informing you whether a file of the same name already exists, and if so, asking whether you want to replace it. Usually, answer 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. Three figure windows appear, summarizing the data types V1, V2, V3. You will put answers the assignments in captions to those figures (see Appendix B). A menu also appears prompting you either to quit, or select another data set for adding to the .mat file. The usual procedure 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), you will be back at step (3) above. If you elect to Quit, you will do step 11 below.
14. The script geosa1 ends, leaving the three figure windows.

Sample output

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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
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Figure 1. I choose as V1 data 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.

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. I choose time series of precipitation, streamflow, sunspot number, sea-surface temperature and atmospheric circulation for V2. 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.

V3 ; time increment = Year

1	MEA41A=Mesa Alta Fir, Tree 41, Core A	Ring Width	mm	1785	2007
2	MEA42A=Mesa Alta Fir, Tree 42, Core A	Ring Width	mm	1623	1892
3	MEA44A=Mesa Alta Fir, Tree 44, Core A	Ring Width	mm	1623	2007
4	MEA45A=Mesa Alta Fir, Tree 45, Core A	Ring Width	mm	1691	2007
5	MEA46A=Mesa Alta Fir, Tree 46, Core A	Ring Width	mm	1745	1949
6	MEA48A=Mesa Alta Fir, Tree 48, Core A	Ring Width	mm	1834	2005
7	MEA51A=Mesa Alta Fir, Tree 51, Core A	Ring Width	mm	1910	2007
8	MEA55A=Mesa Alta Fir, Tree 55, Core A	Ring Width	mm	1722	1949
9	MEA59A=Mesa Alta Fir, Tree 59, Core A	Ring Width	mm	1734	2007

Figure 3. 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.