FOR 496 / 796 Introduction to Dendrochronology

Lab exercise #3:
Tree Ring Chronology Development

Subject:

- Developing a tree ring chronology by cross-dating multiple, overlapping tree ring series using both (i) skeleton plots and (ii) correlation analysis

Purpose:

- to reemphasis the process of cross-dating multiple tree ring series using skeleton plots
- to become acquainted with the application of correlation analysis for cross-dating tree ring series
- to develop an extended tree ring chronology using multiple, overlapping tree ring series
- to become acquainted with the application of image analysis software for the measurement of tree ringwidths

Materials

1. Five tree ring sample "cores" (see last page). **Core Sample A** was obtained from a living tree in the year 2000, so it is known with certainty that the last ring of Core Sample A is from the year 2000. The remaining four samples were obtained from non-living samples.
2. A set of graph paper for creating skeleton plots.
3. Scanned images of each of the tree core samples are available from the course web page for tree ring measurements (http://www.esf.edu/for/bevilacqua/for496).
4. A copy of the "*CooRecorder - Cybis Coordinate Recorder*", to be used for measuring tree rings off the graphic images, can be obtained from the following web page: http://www.cybis.se/forfun/digfoto/CRecorder/mease.htm
5. A copy of the "*CDendro - Cybis dendro dating program*", to be used for cross-dating tree ring series using ringwidth correlations, can be obtained from the following web page: http://www.cybis.se/forfun/dendro/download/downloade.htm

Procedures

1. Create skeleton plots for each of the tree core samples.
2. Create a reference plot for **Core Sample A** by developing a mirror image of the skeleton plot on a separate sheet of graph paper.
3. Using **Core Sample A** reference plot, determine which of the other samples cross-date with **Core Sample A** based on the skeleton plots, applying on the same approach you used in Lab #2.

4. After selecting the core sample which best cross-dates with **Core Sample A**, create a reference plot for that sample by developing a mirror image of the skeleton plot on a separate sheet of graph paper.
5. Determine which of the remaining samples cross-date with this tree ring series.
6. Continue steps 4 & 5 until you cross-date all core samples.
7. After cross-dating all samples using skeleton plots, determine the year of the oldest ring for the final, oldest sample.
8. Read in each of the scanned images (filetype *.JPG) into *CooRecorder* one at a time and measure the tree ring widths, starting from the most recent tree ring (bark side first). Save a separate coordinate position (*.POS) file for each core sample.
9. Read in the coordinate position (*.POS) files from each of the Sample Cores into the *CDendro* program. Set the date of the youngest year for **Core Sample A** as 2000.
10. Select the **Core Sample A** file as the reference file. Cross-date each of the remaining Core Sample files with the Reference file based on correlation analysis. For the core sample that best correlates with **Core Sample A**, set the date of the youngest year for this sample based on the cross-dating with **Core Sample A**. Continue to build the tree ring chronology by cross-dating the remaining core samples until all samples are cross-dated.
11. After cross-dating all samples using correlation analysis, determine the year of the oldest ring for the final, oldest sample.

Question

Compare and contrast skeleton plots and correlation analysis as methods for cross-dating tree ring series in terms of simplicity, efficiency, ease of processing and accuracy of results.

Due Date: Thursday, October 20, 2005