

FOR 496 / 796 Introduction to Dendrochronology

Lab exercise #4: Crossdating multiple sample cores from single tree

Subject:

- Crossdating multiple sample cores from a single tree and developing a single tree chronology
- Crossdating a single tree-ring chronology to a master chronology

Purpose:

- to visually and quantitatively evaluate the variation in tree-ring series taken from within a single tree
- to become familiarized with the process of developing a single chronology based on multiple samples
- to review methods used in cross-dating a tree-ring series to a known chronology

Procedures:

The last page of this lab contains a series of four images representing four radii taken from a single tree disk of unknown dated origin.

Your task is to :

1. measure the tree rings for each radial section and develop individual radial tree-ring series using the **CooRecorder**TM Program
2. visually and quantitatively evaluate how well the individual radial series cross-date with each other using the **CDendro**TM program
3. using the ring-width measurements from the four radial samples from the single tree disk, develop a composite tree-ring chronology for the disk using three techniques:
 - (1) normalized ring-width data using **CDendro**;
 - (2) raw ring-width data using **CDendro**; and
 - (3) standardized ring-width data using **ARSTAN**.
4. cross-date each individual radial series and the composite tree chronologies with a known, master chronology and determine the year of the final growth ring based on a common ring-width pattern using both **CDendro** and **COFECHA**.
5. A flow-chart describing the order and procedures you should follow to complete this lab is given on the next page.

6. To complete this lab, you should submit all of the following:
- (i) Four individual measurement files from CooRecorder (*.POS)
 - (ii) Decadel file containing collection of four normalized radial series (*.RWL)
 - (iii) Decadel file containing collection of four non-normalized (raw ring-width measurements) radial series (*.RWL)
 - (iv) Composite decadel file containing single normalized indexed series for disk from CDendro
 - (v) Composite decadel file containing single non-normalized indexed series for disk from CDendro
 - (vi) Composite decadel file containing single normalized indexed series for disk from ARSTAN
 - (vii) CDendro output from cross-dating individual and composite indices, both non-normalized and normalized data
 - (viii) COFECHA output from cross-dating composite indices based on normalized data
 - (ix) Best estimate for the year of final (outside) growth ring for disk
 - (x) Comparative notes on which procedure gives the 'best' cross-dating results

Data provided:

- (i) Digital images of four radial sections of a single tree disk scanned at 1000 dpi for obtaining tree-ring measurements with the CooRecorder™ tree-ring measurement program:
 - Radius 1:
http://www.esf.edu/for/bevilacqua/for496/for496_lab4_disk_1000_1.JPG
 - Radius 2:
http://www.esf.edu/for/bevilacqua/for496/for496_lab4_disk_1000_2.JPG
 - Radius 3:
http://www.esf.edu/for/bevilacqua/for496/for496_lab4_disk_1000_3.JPG
 - Radius 4:
http://www.esf.edu/for/bevilacqua/for496/for496_lab4_disk_1000_4.JPG
- (ii) A standardized master ring-width chronology based on a sample of over 80 individual trees, from the same geographic area that the tree disk was located. The master chronology (given below) is available for downloading in the Decadel chronology format for easy input into CDendro and COFECHA:
 - <http://www.esf.edu/for/bevilacqua/for496/lab4mast.crn>

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MASTER18659990  09990  09990  09990  09990  0 752  4 560  8 863  81185  91496 14
MASTER18701398 141313 141398 14 752 141205 28 614 28 607 28 566 29 700 35 659 35
MASTER1880 829 451261 45 626 45 928 49 777 49 812 581369 59 603 781325 78 692 78
MASTER1890 971 811342 811121 821236 821374 821368 83 875 831365 831400 831405 84
MASTER19001150 841199 841267 84 631 84 870 841244 84 593 84 696 84 888 84 954 84
MASTER1910 818 841013 841055 841040 84 841 841297 841207 84 878 841050 841146 84
MASTER1920 682 841008 841129 84 957 84 964 841172 84 635 84 870 841182 841131 84
MASTER1930 977 841272 84 991 84 500 84 611 84 683 84 992 841076 84 991 841669 84
MASTER19401150 84 785 84 437 84 665 841144 84 798 84 484 84 697 84 894 84 838 84
MASTER19501484 841546 841410 84 867 84 568 84 898 841029 841305 84 952 84 892 84
MASTER19601058 841240 84 636 841411 84 720 84 795 84 262 841485 84 543 841217 84
MASTER1970 617 841204 841179 841370 84 678 841462 84 955 84 740 84 863 84 695 84
MASTER19801096 841268 841422 84 798 841007 84 770 841406 841302 841143 84 594 84
MASTER19901394 849990 09990 09990 09990 09990 09990 09990 09990 09990 09990 0

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Flow chart of activities

