[] Dendrochronology Program Library Run 128 Program COF 17:36 Fri 11 Mar 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27830

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: 128\_MRG

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

3 Autoregressive model applied A Residuals are used in master dating series and testing

4 Series transformed to logarithms Y Each series log-transformed for master dating series and testing

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .3281

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1930 to 2010 81 years

Continuous time span is 1930 to 2010 81 years

Portion with two or more series is 1935 to 2010 76 years

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*C\* Number of dated series 20 \*C\*

\*O\* Master series 1930 2010 81 yrs \*O\*

\*F\* Total rings in all series 1384 \*F\*

\*E\* Total dated rings checked 1379 \*E\*

\*C\* Series intercorrelation .570 \*C\*

\*H\* Average mean sensitivity .225 \*H\*

\*A\* Segments, possible problems 2 \*A\*

\*\*\* Mean length of series 69.2 \*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ABSENT RINGS listed by SERIES: (See Master Dating Series for absent rings listed by year)

512A 1 absent rings: 2004

518A 3 absent rings: 2000 2003 2004

4 absent rings .289%

PART 2: TIME PLOT OF TREE-RING SERIES: 17:36 Fri 11 Mar 2011 Page 2

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

: : : : : : : : : : : : : : : : : : : : : -------- --- ---- ---- ----

. . . . . . . . . . . . . . . . . . <=======> . 511A 1 1930 2010 81

. . . . . . . . . . . . . . . . . . <=====> . 511B 2 1951 2010 60

. . . . . . . . . . . . . . . . . . <=======> . 512A 3 1936 2010 75

. . . . . . . . . . . . . . . . . . <=======> . 512B 4 1939 2010 72

. . . . . . . . . . . . . . . . . . <=======> . 513A 5 1936 2010 75

. . . . . . . . . . . . . . . . . . <======> . 513B 6 1941 2010 70

. . . . . . . . . . . . . . . . . . <======> . 514A 7 1948 2010 63

. . . . . . . . . . . . . . . . . . <======> . 514B 8 1945 2010 66

. . . . . . . . . . . . . . . . . . <=======> . 515A 9 1935 2010 76

. . . . . . . . . . . . . . . . . . <======> . 515B 10 1943 2010 68

. . . . . . . . . . . . . . . . . . <=======> . 516A 11 1935 2010 76

. . . . . . . . . . . . . . . . . . <======> . 516B 12 1943 2010 68

. . . . . . . . . . . . . . . . . . <======> . 517A 13 1943 2010 68

. . . . . . . . . . . . . . . . . . <=======> . 517B 14 1938 2010 73

. . . . . . . . . . . . . . . . . . <=====> . 518A 15 1958 2010 53

. . . . . . . . . . . . . . . . . . <=====> . 518B 16 1955 2010 56

. . . . . . . . . . . . . . . . . . <======> . 519A 17 1941 2010 70

. . . . . . . . . . . . . . . . . . <======> . 519B 18 1944 2010 67

. . . . . . . . . . . . . . . . . . <=======> . 520A 19 1938 2010 73

. . . . . . . . . . . . . . . . . . <=======> . 520B 20 1937 2010 74

: : : : : : : : : : : : : : : : : : : : :

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

PART 3: Master Dating Series: 17:36 Fri 11 Mar 2011 Page 3

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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1950 .203 17 2000 -.700 20 1

1951 .692 18 2001 .742 20

1952 -.695 18 2002 1.673 20

1953 -1.623 18 2003 -1.885 20 1

1954 .767 18 2004 -2.458 20 2

1955 .602 19 2005 -1.917 20

1956 -1.879 19 2006 -.606 20

1957 .569 19 2007 1.011 20

1958 .755 20 2008 .669 20

1959 -.137 20 2009 .089 20

1960 -1.676 20 2010 1.535 20

1961 .422 20

1962 -1.716 20

1963 -.198 20

1964 .229 20

1965 -.215 20

1966 -.667 20

1967 .563 20

1968 .491 20

1969 1.158 20

1970 .899 20

1971 1.883 20

1972 .265 20

1973 -.356 20

1974 .115 20

1975 .272 20

1976 .789 20

1977 -.377 20

1978 .084 20

1979 -.168 20

1930 -1.464 1 1980 .341 20

1931 .817 1 1981 -2.750 20

1932 2.232 1 1982 -.978 20

1933 1.705 1 1983 -1.028 20

1934 -2.122 1 1984 -1.288 20

1935 .063 3 1985 -.128 20

1936 -.892 5 1986 -.171 20

1937 -.059 6 1987 .902 20

1938 -.593 8 1988 .243 20

1939 -.139 9 1989 .181 20

1940 .025 9 1990 .773 20

1941 -.320 11 1991 -.018 20

1942 .354 11 1992 1.157 20

1943 1.062 14 1993 1.651 20

1944 -.300 15 1994 .688 20

1945 .709 16 1995 -.012 20

1946 .231 16 1996 .127 20

1947 .592 16 1997 -.130 20

1948 -.648 17 1998 -.335 20

1949 .265 17 1999 .055 20

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PART 4: Master Bar Plot: 17:36 Fri 11 Mar 2011 Page 4

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Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

1950------A 2000--c

1951--------C 2001--------C

1952--c 2002----------G

1953f 2003h

1954--------C 2004j

1955-------B 2005h

1956h 2006--b

1957-------B 2007---------D

1958--------C 2008--------C

1959---a 2009-----@

1960g 2010----------F

1961-------B

1962g

1963---a

1964------A

1965---a

1966--c

1967-------B

1968-------B

1969---------E

1970---------D

1971----------H

1972------A

1973---a

1974-----@

1975------A

1976--------C

1977---b

1978-----@

1979---a

1930f 1980------A

1931--------C 1981k

1932----------I 1982-d

1933----------G 1983-d

1934h 1984-e

1935-----@ 1985----a

1936-d 1986---a

1937----@ 1987---------D

1938--b 1988------A

1939---a 1989------A

1940-----@ 1990--------C

1941---a 1991----@

1942------A 1992---------E

1943---------D 1993----------G

1944---a 1994--------C

1945--------C 1995----@

1946------A 1996-----A

1947-------B 1997---a

1948--c 1998---a

1949------A 1999-----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: 17:36 Fri 11 Mar 2011 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under .3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1925 1950 1975

1974 1999 2024

--- -------- --------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----

1 511A 1930 2010 .68 .66 .69

2 511B 1951 2010 .53 .51

3 512A 1936 2010 .65 .73 .70

4 512B 1939 2010 .60 .70 .68

5 513A 1936 2010 .36B .43 .50

6 513B 1941 2010 .40 .46 .58

7 514A 1948 2010 .72 .72 .73

8 514B 1945 2010 .73 .72 .78

9 515A 1935 2010 .46 .49 .36

10 515B 1943 2010 .56 .58 .46

11 516A 1935 2010 .63 .63 .53

12 516B 1943 2010 .52 .57 .64

13 517A 1943 2010 .35 .42 .55

14 517B 1938 2010 .53 .58 .63

15 518A 1958 2010 .39 .41

16 518B 1955 2010 .46 .54

17 519A 1941 2010 .44 .50B .67

18 519B 1944 2010 .50 .52 .78

19 520A 1938 2010 .67 .63 .64

20 520B 1937 2010 .59 .62 .66

Av segment correlation .55 .57 .60

PART 6: POTENTIAL PROBLEMS: 17:36 Fri 11 Mar 2011 Page 5

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For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 50-year segments of series filtered with 32-year spline,

at every point from ten years earlier (-10) to ten years later (+10) than dated

[B] Effect of those data values which most lower or raise correlation with master series

Symbol following year indicates value in series is greater (>) or lesser (<) than master series value

[C] Year-to-year changes very different from the mean change in other series

[D] Absent rings (zero values)

[E] Values which are statistical outliers from mean for the year

====================================================================================================================================

511A 1930 to 2010 81 years Series 1

[\*] Early part of series cannot be checked from 1930 to 1934 -- not matched by another series

[B] Entire series, effect on correlation ( .649) is:

Lower 1986< -.031 1948> -.029 1954< -.020 1994< -.016 1966< -.015 1944> -.009 Higher 1981 .074 1956 .022

====================================================================================================================================

511B 1951 to 2010 60 years Series 2

[B] Entire series, effect on correlation ( .515) is:

Lower 2003> -.037 1983< -.015 1980< -.015 1987< -.012 1959> -.012 1974< -.012 Higher 1962 .028 1981 .023

====================================================================================================================================

512A 1936 to 2010 75 years Series 3

[B] Entire series, effect on correlation ( .612) is:

Lower 2003> -.031 2004< -.031 1938> -.021 1982< -.009 1966> -.006 1947< -.006 Higher 1981 .022 2010 .012

[D] 1 Absent rings: Year Master N series Absent

2004 -2.458 20 2

====================================================================================================================================

512B 1939 to 2010 72 years Series 4

[B] Entire series, effect on correlation ( .598) is:

Lower 1942< -.065 2003> -.037 1982< -.017 1963< -.012 1993< -.008 1939< -.008 Higher 1981 .068 1962 .024

====================================================================================================================================

513A 1936 to 2010 75 years Series 5

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1936 1985 4 - - - - -.03 -.12 .09 .17 -.10 -.15 .36|-.13 -.11 -.17 .42\*-.05 -.04 .07 .11 -.05 -.28

[B] Entire series, effect on correlation ( .419) is:

Lower 1936> -.051 1981> -.040 1977< -.037 1991< -.017 1943< -.011 1938> -.009 Higher 2003 .026 1971 .023

1936 to 1985 segment:

Lower 1936> -.071 1981> -.058 1977< -.045 1943< -.017 1938> -.012 1947< -.009 Higher 1971 .041 1962 .034

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1936 +3.5 SD

====================================================================================================================================

513B 1941 to 2010 70 years Series 6

[B] Entire series, effect on correlation ( .540) is:

Lower 1970< -.017 2005> -.016 1941> -.015 1987< -.014 1964< -.013 1943< -.013 Higher 2003 .117 1962 .018

====================================================================================================================================

514A 1948 to 2010 63 years Series 7

[B] Entire series, effect on correlation ( .735) is:

Lower 1973> -.013 1962< -.013 1985< -.012 1959> -.011 1971< -.010 1958< -.008 Higher 2003 .014 1960 .011

====================================================================================================================================

514B 1945 to 2010 66 years Series 8

[B] Entire series, effect on correlation ( .730) is:

Lower 1960> -.032 1959> -.012 1955> -.009 2003> -.009 1961< -.008 1985< -.007 Higher 1981 .059 1956 .027

====================================================================================================================================

515A 1935 to 2010 76 years Series 9

[B] Entire series, effect on correlation ( .435) is:

Lower 1940< -.029 1974< -.025 1996< -.024 1986> -.018 1967< -.017 1976< -.015 Higher 1956 .069 1981 .041

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1986 +3.2 SD

====================================================================================================================================

515B 1943 to 2010 68 years Series 10

[B] Entire series, effect on correlation ( .562) is:

Lower 1943< -.017 2006< -.016 1962> -.013 1986> -.012 1973> -.012 1967< -.011 Higher 1956 .051 2003 .026

====================================================================================================================================

516A 1935 to 2010 76 years Series 11

[B] Entire series, effect on correlation ( .526) is:

Lower 2003> -.062 1989< -.051 1940> -.028 1935< -.020 1962> -.011 1978< -.010 Higher 1981 .093 1960 .018

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1940 +3.7 SD

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516B 1943 to 2010 68 years Series 12

[B] Entire series, effect on correlation ( .555) is:

Lower 1947< -.059 1960> -.032 1963< -.018 1962> -.017 1983> -.013 1984> -.010 Higher 1981 .088 1971 .017

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517A 1943 to 2010 68 years Series 13

[B] Entire series, effect on correlation ( .423) is:

Lower 1969< -.038 2000< -.036 1956> -.029 1946< -.019 1948> -.016 1951< -.016 Higher 1981 .040 1962 .033

====================================================================================================================================

517B 1938 to 2010 73 years Series 14

[B] Entire series, effect on correlation ( .598) is:

Lower 1962> -.028 2004> -.015 2005> -.014 1953> -.014 1938< -.014 2008< -.011 Higher 2003 .088 1960 .011

====================================================================================================================================

518A 1958 to 2010 53 years Series 15

[B] Entire series, effect on correlation ( .462) is:

Lower 1969< -.076 2000< -.037 1958< -.014 1966> -.014 1986< -.014 1972> -.012 Higher 1981 .133 2003 .054

[D] 3 Absent rings: Year Master N series Absent

2000 -.700 20 1

2003 -1.885 20 1

2004 -2.458 20 2

====================================================================================================================================

518B 1955 to 2010 56 years Series 16

[B] Entire series, effect on correlation ( .480) is:

Lower 1961< -.037 1956> -.035 1975< -.027 1958< -.021 1977> -.019 1983> -.013 Higher 2003 .112 1981 .079

====================================================================================================================================

519A 1941 to 2010 70 years Series 17

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1950 1999 -3 -.16 -.02 -.04 .00 .12 -.07 -.07 .50\* .13 .07 .50| .11 -.09 .15 -.01 -.19 -.13 .07 -.18 -.14 -.29

[B] Entire series, effect on correlation ( .569) is:

Lower 1945< -.041 1960> -.030 1952> -.016 1955< -.015 2008< -.011 1966> -.009 Higher 2003 .099 1971 .013

1950 to 1999 segment:

Lower 1960> -.043 1955< -.030 1952> -.022 1966> -.012 1963< -.008 1985< -.008 Higher 1971 .026 1981 .022

====================================================================================================================================

519B 1944 to 2010 67 years Series 18

[B] Entire series, effect on correlation ( .636) is:

Lower 1952> -.034 1953> -.024 1955< -.019 1945< -.014 1958< -.011 1947> -.011 Higher 2003 .086 1981 .016

====================================================================================================================================

520A 1938 to 2010 73 years Series 19

[B] Entire series, effect on correlation ( .659) is:

Lower 1999< -.029 1979< -.016 2005> -.011 1965> -.008 2010< -.007 1952< -.007 Higher 1956 .035 2003 .031

====================================================================================================================================

520B 1937 to 2010 74 years Series 20

[B] Entire series, effect on correlation ( .669) is:

Lower 1974< -.035 1981> -.016 1960> -.014 1982> -.014 2005> -.011 1944> -.010 Higher 2003 .074 1956 .036

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PART 7: DESCRIPTIVE STATISTICS: 17:36 Fri 11 Mar 2011 Page 6

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

--- -------- --------- ----- ----- ----- ------ ----- ----- ----- ----- ----- ----- ----- ----- --

1 511A 1930 2010 81 3 0 .649 1.28 1.98 .311 .617 .171 2.56 .460 -.045 1

2 511B 1951 2010 60 2 0 .515 1.59 2.45 .381 .631 .166 2.79 .447 -.047 1

3 512A 1936 2010 75 3 0 .612 .76 1.66 .399 .877 .258 2.54 .375 .093 1

4 512B 1939 2010 72 3 0 .598 .84 1.90 .439 .818 .279 2.59 .483 .097 1

5 513A 1936 2010 75 3 1 .419 1.41 2.72 .411 .694 .174 2.67 .447 -.032 1

6 513B 1941 2010 70 3 0 .540 1.12 1.88 .300 .596 .179 2.54 .358 .021 1

7 514A 1948 2010 63 3 0 .735 1.52 2.73 .485 .670 .208 2.48 .450 -.024 1

8 514B 1945 2010 66 3 0 .730 1.18 2.18 .405 .518 .254 2.54 .419 -.047 1

9 515A 1935 2010 76 3 0 .435 .98 2.39 .640 .882 .259 2.73 .461 .000 1

10 515B 1943 2010 68 3 0 .562 1.05 2.84 .646 .832 .303 2.63 .490 -.119 2

11 516A 1935 2010 76 3 0 .526 1.10 2.99 .381 .457 .228 2.96 .489 -.019 2

12 516B 1943 2010 68 3 0 .555 1.04 1.73 .287 .561 .214 2.74 .529 .099 1

13 517A 1943 2010 68 3 0 .423 1.10 2.09 .411 .745 .210 2.69 .469 -.017 1

14 517B 1938 2010 73 3 0 .598 .81 1.54 .328 .822 .207 2.56 .467 -.026 1

15 518A 1958 2010 53 2 0 .462 1.34 2.24 .569 .806 .296 2.33 .456 -.007 1

16 518B 1955 2010 56 2 0 .480 1.21 2.64 .489 .699 .225 2.82 .579 -.033 2

17 519A 1941 2010 70 3 1 .569 1.26 3.50 .659 .729 .270 2.77 .449 .077 5

18 519B 1944 2010 67 3 0 .636 .98 2.45 .416 .462 .291 2.68 .428 .045 1

19 520A 1938 2010 73 3 0 .659 1.51 2.33 .400 .715 .164 2.61 .579 .089 1

20 520B 1937 2010 74 3 0 .669 1.24 1.91 .297 .555 .175 2.55 .431 .069 1

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Total or mean: 1384 57 2 .570 1.16 3.50 .430 .684 .225 2.96 .462 .010

- = [ COFECHA 128 COF ] = -