[] Dendrochronology Program Library Run 52 Program COF 18:35 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: 52\_WOL

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 1912 to 2010 99 years

Continuous time span is 1912 to 2010 99 years

Portion with two or more series is 1918 to 2010 93 years

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

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

\*O\* Master series 1912 2010 99 yrs \*O\*

\*F\* Total rings in all series 1450 \*F\*

\*E\* Total dated rings checked 1444 \*E\*

\*C\* Series intercorrelation .539 \*C\*

\*H\* Average mean sensitivity .223 \*H\*

\*A\* Segments, possible problems 1 \*A\*

\*\*\* Mean length of series 72.5 \*\*\*

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

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

No ring measurements of zero value

PART 2: TIME PLOT OF TREE-RING SERIES: 18:35 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

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

. . . . . . . . . . . . . . . . . . <======> . 161A 1 1943 2010 68

. . . . . . . . . . . . . . . . . . <======> . 161B 2 1942 2010 69

. . . . . . . . . . . . . . . . . .<=========> . 162A 3 1912 2010 99

. . . . . . . . . . . . . . . . . .<=========> . 162B 4 1918 2010 93

. . . . . . . . . . . . . . . . . . <======> . 163A 5 1941 2010 70

. . . . . . . . . . . . . . . . . . <======> . 163B 6 1941 2010 70

. . . . . . . . . . . . . . . . . . <======> . 164A 7 1945 2010 66

. . . . . . . . . . . . . . . . . . <======> . 164B 8 1941 2010 70

. . . . . . . . . . . . . . . . . . <=======> . 165A 9 1938 2010 73

. . . . . . . . . . . . . . . . . . <=======> . 165B 10 1933 2010 78

. . . . . . . . . . . . . . . . . . <======> . 166A 11 1947 2010 64

. . . . . . . . . . . . . . . . . . <=======> . 166B 12 1938 2010 73

. . . . . . . . . . . . . . . . . . <======> . 167A 13 1941 2010 70

. . . . . . . . . . . . . . . . . . <=======> . 167B 14 1938 2010 73

. . . . . . . . . . . . . . . . . . <======> . 168A 15 1944 2010 67

. . . . . . . . . . . . . . . . . . <======> . 168B 16 1941 2010 70

. . . . . . . . . . . . . . . . . . <======> . 169A 17 1942 2010 69

. . . . . . . . . . . . . . . . . . <=======> . 169B 18 1939 2010 72

. . . . . . . . . . . . . . . . . . <======> . 170A 19 1943 2010 68

. . . . . . . . . . . . . . . . . . <======> . 170B 20 1943 2010 68

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

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: 18:35 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 .017 20 2000 -.083 20

1951 1.052 20 2001 .727 20

1952 .678 20 2002 .324 20

1953 -.850 20 2003 -.984 20

1954 .165 20 2004 -.775 20

1955 .495 20 2005 -.093 20

1956 -1.232 20 2006 -1.162 20

1957 .230 20 2007 -.506 20

1958 1.179 20 2008 -.815 20

1959 -.298 20 2009 1.213 20

1960 -.948 20 2010 1.380 20

1961 .352 20

1912 -1.483 1 1962 -1.146 20

1913 -.362 1 1963 -.027 20

1914 1.955 1 1964 .314 20

1915 1.452 1 1965 .835 20

1916 1.236 1 1966 -.286 20

1917 .849 1 1967 -.609 20

1918 1.571 2 1968 .794 20

1919 .460 2 1969 .887 20

1920 .962 2 1970 .368 20

1921 .882 2 1971 .769 20

1922 -.059 2 1972 -.158 20

1923 .144 2 1973 -.283 20

1924 .531 2 1974 -.119 20

1925 -.517 2 1975 -.343 20

1926 -1.566 2 1976 -.183 20

1927 -1.406 2 1977 .651 20

1928 -2.808 2 1978 .943 20

1929 -3.120 2 1979 -.261 20

1930 -3.255 2 1980 .787 20

1931 -.333 2 1981 -.588 20

1932 -.127 2 1982 -2.930 20

1933 1.006 3 1983 -1.306 20

1934 .666 3 1984 -.838 20

1935 -.060 3 1985 .199 20

1936 .098 3 1986 .355 20

1937 1.329 3 1987 1.191 20

1938 .843 6 1988 .269 20

1939 -.470 7 1989 -.746 20

1940 -.590 7 1990 -.912 20

1941 -.683 12 1991 -.963 20

1942 .144 14 1992 .624 20

1943 -.241 17 1993 1.463 20

1944 .153 18 1994 .480 20

1945 1.143 19 1995 .739 20

1946 -.102 19 1996 -.624 20

1947 .665 20 1997 -.055 20

1948 .169 20 1998 .514 20

1949 -.613 20 1999 1.669 20

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PART 4: Master Bar Plot: 18:35 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-----@ 2000----@

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

1952--------C 2002------A

1953-c 2003-d

1954-----A 2004--c

1955-------B 2005----@

1956-e 2006-e

1957------A 2007--b

1958---------E 2008-c

1959---a 2009---------E

1960-d 2010----------F

1961------A

1912f 1962-e

1913---a 1963----@

1914----------H 1964------A

1915----------F 1965--------C

1916----------E 1966---a

1917--------C 1967--b

1918----------F 1968--------C

1919-------B 1969--------D

1920---------D 1970------A

1921--------D 1971--------C

1922----@ 1972----a

1923-----A 1973---a

1924-------B 1974----@

1925--b 1975---a

1926f 1976----a

1927f 1977-------C

1928k 1978---------D

1929l 1979---a

1930m 1980--------C

1931---a 1981--b

1932----a 1982l

1933---------D 1983e

1934--------C 1984-c

1935----@ 1985-----A

1936-----@ 1986------A

1937----------E 1987---------E

1938--------C 1988------A

1939---b 1989--c

1940--b 1990-d

1941--c 1991-d

1942-----A 1992-------B

1943---a 1993----------F

1944-----A 1994-------B

1945---------E 1995--------C

1946----@ 1996--b

1947--------C 1997----@

1948-----A 1998-------B

1949--b 1999----------G

PART 5: CORRELATION OF SERIES BY SEGMENTS: 18:35 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 1900 1925 1950 1975

1949 1974 1999 2024

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

1 161A 1943 2010 .72 .78 .78

2 161B 1942 2010 .39 .50 .55

3 162A 1912 2010 .51 .42 .55 .58

4 162B 1918 2010 .38 .33B .56 .56

5 163A 1941 2010 .42 .55 .61

6 163B 1941 2010 .52 .61 .51

7 164A 1945 2010 .71 .73 .77

8 164B 1941 2010 .70 .71 .71

9 165A 1938 2010 .44 .56 .62

10 165B 1933 2010 .53 .64 .50

11 166A 1947 2010 .66 .72 .76

12 166B 1938 2010 .44 .47 .58

13 167A 1941 2010 .51 .56 .55

14 167B 1938 2010 .34 .43 .44

15 168A 1944 2010 .33 .36 .40

16 168B 1941 2010 .43 .59 .63

17 169A 1942 2010 .58 .55 .49

18 169B 1939 2010 .49 .51 .42

19 170A 1943 2010 .62 .64 .66

20 170B 1943 2010 .54 .68 .68

Av segment correlation .45 .51 .59 .59

PART 6: POTENTIAL PROBLEMS: 18:35 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

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

161A 1943 to 2010 68 years Series 1

[B] Entire series, effect on correlation ( .732) is:

Lower 1948< -.037 1979> -.033 1957< -.019 2000> -.014 1949> -.012 2004> -.008 Higher 1982 .057 1953 .010

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

161B 1942 to 2010 69 years Series 2

[B] Entire series, effect on correlation ( .420) is:

Lower 1946< -.077 1943> -.016 2000> -.015 1988< -.015 1979> -.012 1957< -.012 Higher 1982 .063 2009 .019

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

162A 1912 to 2010 99 years Series 3

[\*] Early part of series cannot be checked from 1912 to 1917 -- not matched by another series

[B] Entire series, effect on correlation ( .532) is:

Lower 1934< -.052 1973< -.029 1953> -.015 1949> -.014 1984> -.010 1969< -.009 Higher 1982 .052 1956 .020

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

1973 -5.2 SD

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

162B 1918 to 2010 93 years Series 4

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

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

1925 1974 10 .11 -.31 -.09 .02 .11 -.22 .06 .04 -.02 -.09 .33| .05 .07 .26 -.06 -.23 .01 .10 -.10 -.06 .39\*

[B] Entire series, effect on correlation ( .446) is:

Lower 1928> -.025 1938< -.022 1939> -.020 1946< -.017 2000> -.014 2002< -.013 Higher 1982 .051 1956 .014

1925 to 1974 segment:

Lower 1938< -.038 1939> -.033 1928> -.025 1946< -.018 1952< -.018 1967> -.009 Higher 1956 .030 1937 .024

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

163A 1941 to 2010 70 years Series 5

[B] Entire series, effect on correlation ( .523) is:

Lower 1985< -.042 1941> -.028 1950< -.015 1966> -.013 1967> -.012 1983> -.012 Higher 1982 .024 1999 .016

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

163B 1941 to 2010 70 years Series 6

[B] Entire series, effect on correlation ( .482) is:

Lower 2000> -.046 1941> -.038 1945< -.029 1989> -.026 1990> -.024 1993< -.012 Higher 1982 .075 1956 .037

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1941 +3.2 SD; 1989 +3.0 SD; 1990 +4.2 SD

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

164A 1945 to 2010 66 years Series 7

[B] Entire series, effect on correlation ( .745) is:

Lower 1990< -.017 1946> -.013 1967> -.013 1975> -.012 1952< -.011 1969< -.009 Higher 1982 .064 1999 .010

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164B 1941 to 2010 70 years Series 8

[B] Entire series, effect on correlation ( .682) is:

Lower 1952< -.017 1996> -.016 2010< -.015 1981< -.014 1946> -.012 1997< -.011 Higher 1982 .036 1962 .013

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165A 1938 to 2010 73 years Series 9

[B] Entire series, effect on correlation ( .498) is:

Lower 1950< -.035 1946> -.026 2003> -.022 1966> -.022 1943< -.020 1963< -.018 Higher 1982 .098 1999 .016

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165B 1933 to 2010 78 years Series 10

[B] Entire series, effect on correlation ( .444) is:

Lower 1934> -.048 2009< -.044 1946> -.028 2000> -.023 2003> -.018 1983> -.016 Higher 1982 .143 1956 .016

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

1983 +3.4 SD

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166A 1947 to 2010 64 years Series 11

[B] Entire series, effect on correlation ( .689) is:

Lower 1962> -.043 1954< -.038 1948< -.026 2003> -.010 1983< -.009 1966> -.008 Higher 1982 .082 1999 .011

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166B 1938 to 2010 73 years Series 12

[B] Entire series, effect on correlation ( .502) is:

Lower 1974< -.030 1953> -.021 1992< -.018 1954< -.016 1959> -.015 1941> -.014 Higher 1982 .017 2009 .016

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167A 1941 to 2010 70 years Series 13

[B] Entire series, effect on correlation ( .553) is:

Lower 1964< -.038 1959> -.027 2002> -.019 1982> -.017 1942< -.014 1979> -.010 Higher 1956 .026 2000 .017

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

167B 1938 to 2010 73 years Series 14

[B] Entire series, effect on correlation ( .427) is:

Lower 1968< -.033 1982> -.026 1939> -.022 1942< -.021 2007< -.019 1969< -.015 Higher 2003 .022 1953 .017

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168A 1944 to 2010 67 years Series 15

[B] Entire series, effect on correlation ( .376) is:

Lower 1982> -.074 1944< -.044 2010< -.019 1953> -.018 1983< -.017 1975> -.014 Higher 2000 .030 1962 .029

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

1982 +3.1 SD

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168B 1941 to 2010 70 years Series 16

[B] Entire series, effect on correlation ( .528) is:

Lower 1941< -.098 1965< -.021 1982> -.011 1949> -.011 1953> -.011 1979> -.010 Higher 1956 .018 2003 .015

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

1941 -4.9 SD

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169A 1942 to 2010 69 years Series 17

[B] Entire series, effect on correlation ( .518) is:

Lower 1996> -.038 2000> -.034 1942< -.022 1990> -.019 1972> -.019 1977< -.016 Higher 1982 .105 1962 .019

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

169B 1939 to 2010 72 years Series 18

[B] Entire series, effect on correlation ( .514) is:

Lower 1964< -.046 1970< -.037 1962> -.031 1963< -.025 2000> -.018 1939< -.017 Higher 1982 .048 1956 .029

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1962 +3.0 SD; 1986 +3.5 SD

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170A 1943 to 2010 68 years Series 19

[B] Entire series, effect on correlation ( .672) is:

Lower 1984< -.094 1994> -.010 1945< -.009 1967< -.007 1962> -.007 1969< -.006 Higher 1982 .054 2000 .012

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170B 1943 to 2010 68 years Series 20

[B] Entire series, effect on correlation ( .571) is:

Lower 1945< -.043 1953< -.019 1946> -.018 2000> -.014 1944< -.012 1988> -.010 Higher 1999 .017 2003 .015

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PART 7: DESCRIPTIVE STATISTICS: 18:35 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 161A 1943 2010 68 3 0 .732 1.98 4.10 .772 .802 .204 2.82 .561 .041 1

2 161B 1942 2010 69 3 0 .420 1.94 4.37 .778 .785 .191 2.42 .328 -.073 1

3 162A 1912 2010 99 4 0 .532 .99 3.06 .657 .841 .286 2.96 .546 -.054 2

4 162B 1918 2010 93 4 1 .446 1.49 4.37 .818 .881 .230 2.61 .429 -.083 1

5 163A 1941 2010 70 3 0 .523 1.32 2.80 .570 .812 .237 2.78 .549 -.017 1

6 163B 1941 2010 70 3 0 .482 1.57 5.59 .867 .905 .202 2.73 .594 -.093 1

7 164A 1945 2010 66 3 0 .745 1.57 3.51 .530 .755 .166 2.68 .512 .064 1

8 164B 1941 2010 70 3 0 .682 1.69 4.32 .934 .858 .217 2.70 .544 .096 1

9 165A 1938 2010 73 3 0 .498 1.70 3.34 .662 .744 .232 2.78 .564 -.007 1

10 165B 1933 2010 78 3 0 .444 1.43 4.09 .960 .946 .231 2.48 .396 -.048 1

11 166A 1947 2010 64 3 0 .689 1.93 4.43 1.460 .965 .219 2.58 .511 .021 1

12 166B 1938 2010 73 3 0 .502 2.32 5.78 1.638 .898 .264 2.53 .477 -.026 1

13 167A 1941 2010 70 3 0 .553 1.80 6.00 1.596 .961 .226 2.69 .485 .021 1

14 167B 1938 2010 73 3 0 .427 2.00 6.21 1.610 .937 .207 2.53 .453 -.008 5

15 168A 1944 2010 67 3 0 .376 1.98 4.16 1.092 .934 .156 2.60 .533 -.071 1

16 168B 1941 2010 70 3 0 .528 1.61 4.25 1.224 .964 .191 2.46 .381 -.088 1

17 169A 1942 2010 69 3 0 .518 1.62 3.19 .756 .828 .234 2.57 .547 -.035 1

18 169B 1939 2010 72 3 0 .514 1.72 3.82 .822 .850 .218 2.95 .606 .000 1

19 170A 1943 2010 68 3 0 .672 1.61 4.04 1.069 .889 .271 2.50 .462 -.017 2

20 170B 1943 2010 68 3 0 .571 1.64 4.17 .949 .867 .250 2.60 .417 -.063 1

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Total or mean: 1450 62 1 .539 1.68 6.21 .980 .871 .223 2.96 .494 -.024

- = [ COFECHA 52 COF ] = -