[] Dendrochronology Program Library Run GREE2 Program COF 12:23 Mon 11 Mar 2013 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 28561

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: GREE2\_5

File of DATED series: GREE2\_5COMP

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 30 years lagged successively by 15 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 .4226

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 1862 to 2012 151 years

Continuous time span is 1862 to 2012 151 years

Portion with two or more series is 1862 to 2012 151 years

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

\*C\* Number of dated series 21 \*C\*

\*O\* Master series 1862 2012 151 yrs \*O\*

\*F\* Total rings in all series 2606 \*F\*

\*E\* Total dated rings checked 2606 \*E\*

\*C\* Series intercorrelation .575 \*C\*

\*H\* Average mean sensitivity .213 \*H\*

\*A\* Segments, possible problems 34 \*A\*

\*\*\* Mean length of series 124.1 \*\*\*

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

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: GREE2\_5 12:23 Mon 11 Mar 2013 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

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

. . . . . . . . . . . . . . . . . <============> . 89A 1 1886 2012 127

. . . . . . . . . . . . . . . . . <============> . 89B 2 1881 2012 132

. . . . . . . . . . . . . . . . . <===========> . 90A 3 1895 2012 118

. . . . . . . . . . . . . . . . . <============> . 90B 4 1888 2012 125

. . . . . . . . . . . . . . . . . <=============> . 91A 5 1879 2012 134

. . . . . . . . . . . . . . . . . <============> . 91B 6 1881 2012 132

. . . . . . . . . . . . . . . . . . <=======> . 92A 7 1935 2012 78

. . . . . . . . . . . . . . . . . . <=======> . 92B 8 1935 2012 78

. . . . . . . . . . . . . . . . .<==============> . 93A 9 1864 2012 149

. . . . . . . . . . . . . . . . .<==============> . 93B 10 1866 2012 147

. . . . . . . . . . . . . . . . . <============> . 94A 11 1880 2012 133

. . . . . . . . . . . . . . . . . <===========> . 94B 12 1890 2012 123

. . . . . . . . . . . . . . . . . <===========> . 95A 13 1890 2012 123

. . . . . . . . . . . . . . . . . . <========> . 96A 14 1922 2012 91

. . . . . . . . . . . . . . . . . . <=======> . 96B 15 1935 2012 78

. . . . . . . . . . . . . . . . . <=============> . 97A 16 1873 2012 140

. . . . . . . . . . . . . . . . .<==============> . 97B 17 1862 2012 151

. . . . . . . . . . . . . . . . . <=============> . 98A 18 1872 2012 141

. . . . . . . . . . . . . . . . .<==============> . 98B 19 1862 2012 151

. . . . . . . . . . . . . . . . . <===========> . 100A 20 1893 2012 120

. . . . . . . . . . . . . . . . . <=============> . 100B 21 1878 2012 135

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

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: GREE2\_5 12:23 Mon 11 Mar 2013 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

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

1900 -2.124 17 1950 -1.092 21 2000 -1.542 21

1901 -2.146 17 1951 -.915 21 2001 -.634 21

1902 -.509 17 1952 .315 21 2002 1.246 21

1903 .774 17 1953 -.784 21 2003 -.480 21

1904 1.017 17 1954 .309 21 2004 .263 21

1905 .597 17 1955 .586 21 2005 .061 21

1906 .571 17 1956 -.658 21 2006 -1.749 21

1907 .179 17 1957 .814 21 2007 -.393 21

1908 .326 17 1958 1.732 21 2008 -.382 21

1909 .315 17 1959 .607 21 2009 .804 21

1910 .431 17 1960 .857 21 2010 1.875 21

1911 -1.298 17 1961 1.854 21 2011 .017 21

1862 -.729 2 1912 .182 17 1962 .825 21 2012 1.419 21

1863 -.292 2 1913 .740 17 1963 1.186 21

1864 .316 3 1914 .160 17 1964 .080 21

1865 2.508 3 1915 .636 17 1965 .046 21

1866 -1.005 4 1916 1.362 17 1966 -1.022 21

1867 .851 4 1917 .120 17 1967 -1.492 21

1868 -.116 4 1918 -.325 17 1968 -.727 21

1869 .916 4 1919 .465 17 1969 -.455 21

1870 1.893 4 1920 .942 17 1970 .474 21

1871 -.237 4 1921 .670 17 1971 .604 21

1872 .563 5 1922 .207 18 1972 -1.139 21

1873 .633 6 1923 .296 18 1973 .190 21

1874 .408 6 1924 1.594 18 1974 -2.648 21

1875 -1.760 6 1925 .356 18 1975 -1.049 21

1876 -.851 6 1926 -.677 18 1976 .016 21

1877 -.796 6 1927 .110 18 1977 .725 21

1878 -.353 7 1928 -.565 18 1978 .011 21

1879 -.306 8 1929 -1.684 18 1979 -1.799 21

1880 1.001 9 1930 -2.140 18 1980 .298 21

1881 -.707 11 1931 -1.406 18 1981 -.351 21

1882 .301 11 1932 .096 18 1982 1.133 21

1883 .124 11 1933 -1.121 18 1983 -.164 21

1884 .221 11 1934 -1.019 18 1984 -.863 21

1885 .790 11 1935 -.608 21 1985 .234 21

1886 .835 12 1936 .646 21 1986 .600 21

1887 -.908 12 1937 .618 21 1987 .692 21

1888 -.676 13 1938 1.244 21 1988 .106 21

1889 .601 13 1939 1.178 21 1989 -.781 21

1890 .377 15 1940 .680 21 1990 .622 21

1891 1.169 15 1941 1.759 21 1991 .761 21

1892 .107 15 1942 .643 21 1992 1.963 21

1893 -.346 16 1943 -.082 21 1993 2.629 21

1894 1.273 16 1944 -.170 21 1994 -.152 21

1895 -.577 17 1945 .457 21 1995 .539 21

1896 -.201 17 1946 -.832 21 1996 -1.473 21

1897 -.427 17 1947 -.925 21 1997 -1.379 21

1898 -1.646 17 1948 -1.385 21 1998 -1.365 21

1899 -2.530 17 1949 -.965 21 1999 -.823 21

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PART 4: Master Bar Plot: GREE2\_5 12:23 Mon 11 Mar 2013 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

1900h 1950-d 2000f

1901i 1951--d 2001--c

1902---b 1952------A 2002---------E

1903--------C 1953--c 2003---b

1904---------D 1954------A 2004------A

1905-------B 1955-------B 2005-----@

1906-------B 1956--c 2006g

1907-----A 1957--------C 2007---b

1908------A 1958----------G 2008---b

1909------A 1959-------B 2009--------C

1910------B 1960---------C 2010----------H

1911-e 1961----------G 2011-----@

1862--c 1912-----A 1962---------C 2012----------F

1863----a 1913--------C 1963---------E

1864------A 1914-----A 1964-----@

1865----------J 1915-------C 1965-----@

1866-d 1916----------E 1966-d

1867---------C 1917-----@ 1967f

1868----@ 1918---a 1968--c

1869---------D 1919-------B 1969---b

1870----------H 1920---------D 1970-------B

1871----a 1921--------C 1971-------B

1872-------B 1922-----A 1972-e

1873-------C 1923------A 1973-----A

1874------B 1924----------F 1974k

1875g 1925------A 1975-d

1876--c 1926--c 1976-----@

1877--c 1927-----@ 1977--------C

1878---a 1928---b 1978-----@

1879---a 1929g 1979g

1880---------D 1930i 1980------A

1881--c 1931f 1981---a

1882------A 1932-----@ 1982---------E

1883-----@ 1933-d 1983----a

1884------A 1934-d 1984--c

1885--------C 1935---b 1985------A

1886---------C 1936--------C 1986-------B

1887--d 1937-------B 1987--------C

1888--c 1938---------E 1988-----@

1889-------B 1939---------E 1989--c

1890------B 1940--------C 1990-------B

1891---------E 1941----------G 1991--------C

1892-----@ 1942--------C 1992----------H

1893---a 1943----@ 1993----------K

1894---------E 1944----a 1994----a

1895---b 1945-------B 1995-------B

1896----a 1946--c 1996f

1897---b 1947-d 1997-f

1898g 1948-f 1998-e

1899j 1949-d 1999--c

PART 5: CORRELATION OF SERIES BY SEGMENTS: GREE2\_5 12:23 Mon 11 Mar 2013 Page 5

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Correlations of 30-year dated segments, lagged 15 years

Flags: A = correlation under .4226 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1860 1875 1890 1905 1920 1935 1950 1965 1980 1995

1889 1904 1919 1934 1949 1964 1979 1994 2009 2024

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

1 89A 1886 2012 .31B .44 .38A .48 .58 .59 .63 .68 .70

2 89B 1881 2012 .28B .48 .43 .45 .63 .39B .48 .66 .61

3 90A 1895 2012 .37A .37B .58 .43B .68 .77 .81 .80

4 90B 1888 2012 .31A .35A .30A .55 .59 .68 .69 .77 .78

5 91A 1879 2012 .59 .64 .63 .54 .37A .56 .75 .77 .81

6 91B 1881 2012 .74 .65 .65 .75 .66 .76 .78 .71 .74

7 92A 1935 2012 .35B .45 .50B .65 .64

8 92B 1935 2012 .58 .71 .71 .78 .77

9 93A 1864 2012 .57 .66 .72 .50 .41A .56 .28A .30A .74 .78

10 93B 1866 2012 .53 .50 .73 .68 .45 .27B .45B .33B .44 .34A

11 94A 1880 2012 .66 .72 .40A .55 .50 .45 .62 .51 .58

12 94B 1890 2012 .42 .38A .61 .54 .66 .71 .61 .65

13 95A 1890 2012 .34A .45 .51 .39A .69 .71 .48 .55

14 96A 1922 2012 .39B .65 .65 .68 .72 .72

15 96B 1935 2012 .42A .44 .52 .72 .74

16 97A 1873 2012 .46 .76 .65 .30B .29A .57 .57 .67 .64 .61

17 97B 1862 2012 .48 .75 .72 .67 .63 .57 .44 .47 .66 .70

18 98A 1872 2012 .36A .35A .57 .63 .61 .56 .79 .85 .81 .83

19 98B 1862 2012 .43 .44 .68 .65 .68 .57 .77 .84 .73 .75

20 100A 1893 2012 .39A .41B .44 .58 .80 .85 .77 .77

21 100B 1878 2012 .30A .64 .56B .59 .43 .68 .53 .50 .53

Av segment correlation .47 .51 .56 .49 .53 .51 .59 .64 .67 .69

PART 6: POTENTIAL PROBLEMS: GREE2\_5 12:23 Mon 11 Mar 2013 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 30-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

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

89A 1886 to 2012 127 years Series 1

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

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

1886 1915 -3 -.07 .08 -.04 .05 .35 .16 -.18 .35\*-.24 -.01 .31|-.08 .31 .30 -.05 .07 .13 .07 -.05 -.07 -.19

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

1905 1934 0 .02 -.22 .16 .16 .07 .07 -.09 .24 -.04 -.23 .38\* .21 -.07 .11 .14 .14 .17 -.02 -.18 .23 -.29

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

Lower 1887> -.027 1928< -.011 1975< -.011 1905< -.010 1979> -.009 2003< -.009 Higher 1974 .029 2006 .015

1886 to 1915 segment:

Lower 1887> -.132 1905< -.051 1904< -.043 1890< -.032 1911> -.019 1901> -.019 Higher 1898 .074 1895 .034

1905 to 1934 segment:

Lower 1905< -.047 1924< -.044 1929> -.032 1911> -.030 1920< -.028 1928< -.025 Higher 1933 .047 1930 .035

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

89B 1881 to 2012 132 years Series 2

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

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

1881 1910 -3 -.29 -.06 -.29 -.17 .21 .08 -.11 .40\*-.08 .07 .28|-.16 .37 .15 -.29 .07 .03 .12 .07 .05 -.02

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

1950 1979 -1 -.12 -.14 .20 .15 -.09 .10 .04 .36 -.19 .39\* .39|-.27 .08 .14 .04 .13 -.16 -.27 .16 .02 -.04

[B] Entire series, effect on correlation ( .461) is:

Lower 1975< -.042 1887> -.024 2011> -.016 1974> -.016 1890< -.013 2005< -.011 Higher 1994 .035 1979 .012

1881 to 1910 segment:

Lower 1887> -.138 1890< -.087 1904< -.028 1881> -.023 1905< -.014 1883> -.010 Higher 1898 .077 1899 .055

1950 to 1979 segment:

Lower 1975< -.174 1974> -.072 1954< -.021 1970< -.010 1968> -.009 1962> -.007 Higher 1961 .048 1979 .044

[C] Year-to-year changes diverging by over 4.0 std deviations:

1974 1975 -4.7 SD

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

90A 1895 to 2012 118 years Series 3

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

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1895 1924 0 -.10 -.05 -.02 .21 .02 -.13 .10 -.26 -.12 .15 .37\* .13 -.04 .05 .00 -.35 -.29 .09 .07 -.16 .16

1905 1934 -7 -.20 -.18 .25 .38\* .00 .10 .34 .05 .00 .03 .37|-.03 -.31 -.06 .07 -.21 -.28 -.06 .00 -.12 .11

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

1935 1964 -3 -.17 -.04 -.48 -.04 .18 .13 .12 .50\* .02 .37 .43| .01 .12 .02 .04 -.16 -.35 -.20 -.21 -.26 -.30

[B] Entire series, effect on correlation ( .631) is:

Lower 1895> -.021 1918< -.021 1942> -.012 1964> -.011 1926> -.011 1950> -.008 Higher 1974 .050 1993 .010

1895 to 1924 segment:

Lower 1895> -.096 1918< -.052 1913< -.033 1919< -.030 1916< -.027 1901> -.018 Higher 1899 .103 1924 .067

1905 to 1934 segment:

Lower 1918< -.066 1926> -.058 1913< -.035 1919< -.031 1916< -.025 1917> -.017 Higher 1924 .088 1933 .042

1935 to 1964 segment:

Lower 1942> -.076 1964> -.064 1950> -.048 1936< -.039 1952< -.027 1963< -.019 Higher 1961 .059 1958 .056

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

90B 1888 to 2012 125 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

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

1888 1917 0 .00 -.02 -.20 .08 .03 -.17 -.37 -.26 .01 .03 .31\* .15 .00 .04 .00 -.15 -.20 -.09 -.36 .05 .13

1890 1919 0 -.03 -.04 -.15 .05 .09 -.22 -.35 -.20 .04 -.17 .35\* .25 -.04 .15 -.04 -.19 -.12 -.30 -.28 .02 -.01

1905 1934 0 -.12 -.14 .12 .21 .10 .06 .11 -.10 .15 -.10 .30\* .07 -.30 -.01 .14 -.21 -.19 -.23 -.30 -.09 -.02

[B] Entire series, effect on correlation ( .604) is:

Lower 1913< -.040 1972> -.018 1888< -.017 1901> -.013 1916< -.013 1940< -.010 Higher 1974 .048 2006 .010

1888 to 1917 segment:

Lower 1913< -.137 1901> -.060 1916< -.043 1908< -.028 1888< -.026 1895> -.023 Higher 1911 .059 1898 .050

1890 to 1919 segment:

Lower 1913< -.170 1901> -.062 1916< -.052 1908< -.035 1895> -.021 1914> -.016 Higher 1911 .065 1898 .055

1905 to 1934 segment:

Lower 1913< -.184 1916< -.054 1926> -.038 1908< -.037 1929> -.028 1914> -.019 Higher 1911 .076 1933 .038

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

91A 1879 to 2012 134 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

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

1935 1964 0 -.45 -.01 -.05 -.17 -.11 -.01 -.07 .22 -.04 .05 .37\* .06 .26 .26 -.02 .30 -.29 -.27 -.06 -.26 -.14

[B] Entire series, effect on correlation ( .616) is:

Lower 1951< -.041 1984> -.017 1887< -.013 1941< -.010 1879> -.009 1925> -.009 Higher 1994 .019 1974 .018

1935 to 1964 segment:

Lower 1951< -.122 1941< -.043 1948> -.025 1947> -.023 1950> -.021 1935> -.012 Higher 1958 .048 1953 .044

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

1887 -5.0 SD

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91B 1881 to 2012 132 years Series 6

[B] Entire series, effect on correlation ( .721) is:

Lower 1918< -.011 1984> -.007 1956< -.007 1950> -.006 1926> -.005 1955< -.005 Higher 1974 .026 1996 .007

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92A 1935 to 2012 78 years Series 7

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

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

1935 1964 3 -.18 -.23 -.31 -.38 -.16 -.07 -.14 .15 -.03 -.19 .35| .20 .13 .57\* .03 .15 -.11 -.13 .08 -.16 -.01

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1965 1994 -10 .52\*-.02 -.11 -.17 .09 .32 -.06 -.14 -.29 -.04 .50|-.07 .07 -.34 -.21 .11 -.25 .17 -.27 -.12 .24

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

Lower 1945< -.047 1984< -.035 1974> -.014 1963< -.012 1969> -.012 1956> -.012 Higher 2006 .024 1996 .018

1935 to 1964 segment:

Lower 1945< -.128 1956> -.052 1950> -.046 1942> -.039 1963< -.032 1944> -.017 Higher 1946 .076 1953 .060

1965 to 1994 segment:

Lower 1984< -.131 1974> -.021 1969> -.018 1978< -.016 1987< -.010 1979> -.010 Higher 1994 .023 1992 .019

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

92B 1935 to 2012 78 years Series 8

[B] Entire series, effect on correlation ( .704) is:

Lower 1979> -.014 1956> -.013 1989< -.011 1953> -.010 1970< -.007 1944> -.005 Higher 1974 .014 1993 .011

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93A 1864 to 2012 149 years Series 9

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

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

1920 1949 0 -.38 .14 .17 -.28 -.14 .17 .16 .08 -.10 .17 .41\*-.14 .08 .28 .05 -.09 -.35 .09 -.02 -.12 -.38

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1950 1979 0 -.23 -.27 -.24 -.16 -.01 -.04 .14 .06 .02 -.14 .28\*-.11 .06 .25 -.14 -.10 .05 -.08 .01 -.12 -.03

1965 1994 0 .16 -.16 -.24 .20 .00 .07 -.12 -.18 .08 -.12 .30\*-.18 .08 .04 -.31 -.16 -.01 .00 .04 .09 -.10

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

Lower 1974> -.065 1926< -.022 1946> -.009 1879< -.007 1982< -.007 1906< -.005 Higher 1887 .011 1992 .010

1920 to 1949 segment:

Lower 1926< -.120 1946> -.058 1947> -.030 1929> -.026 1925> -.024 1937< -.009 Higher 1941 .064 1924 .035

1950 to 1979 segment:

Lower 1974> -.343 1950< -.023 1952< -.011 1975> -.009 1965< -.008 1976< -.005 Higher 1958 .061 1961 .055

1965 to 1994 segment:

Lower 1974> -.332 1982< -.041 1986< -.017 1985< -.015 1965< -.012 1975> -.011 Higher 1993 .093 1992 .093

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

1911 -4.9 SD; 1974 +4.4 SD; 1975 +3.0 SD

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

93B 1866 to 2012 147 years Series 10

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

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

1935 1964 -2 -.38 -.04 .01 .16 .34 .18 .31 .29 .35\* .24 .27|-.20 .19 -.15 -.40 -.12 -.25 -.36 -.09 -.33 -.13

1950 1979 -5 -.13 -.16 -.08 .29 -.01 .50\* .14 .14 -.07 .16 .45|-.22 .21 -.32 .24 -.01 .00 -.17 -.22 -.08 .01

1965 1994 -5 -.04 -.36 .03 .26 -.11 .40\*-.02 .09 -.03 .05 .33|-.21 .12 -.28 .09 -.01 .00 -.10 -.09 .20 -.02

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1983 2012 0 .04 -.27 -.23 .16 -.04 -.19 -.12 .03 .32 -.13 .34\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .451) is:

Lower 2010< -.030 1984> -.019 1875> -.014 1946> -.013 1983> -.011 1982< -.011 Higher 2006 .014 1996 .012

1935 to 1964 segment:

Lower 1946> -.100 1947> -.046 1959> -.045 1954< -.040 1936< -.030 1943> -.027 Higher 1961 .093 1948 .083

1950 to 1979 segment:

Lower 1974> -.034 1977< -.034 1959> -.024 1956> -.022 1954< -.017 1967> -.014 Higher 1961 .049 1979 .043

1965 to 1994 segment:

Lower 1984> -.064 1983> -.037 1977< -.029 1982< -.028 1985< -.018 1994> -.016 Higher 1979 .087 1993 .054

1983 to 2012 segment:

Lower 2010< -.146 1984> -.087 1983> -.045 2003> -.040 1985< -.033 1986< -.025 Higher 2006 .089 1996 .076

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

1979 -6.4 SD; 1984 +3.2 SD

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

94A 1880 to 2012 133 years Series 11

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

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

1905 1934 0 -.01 .22 .15 -.15 -.20 -.41 -.05 .13 -.19 .02 .40\* .05 -.08 .08 .35 .09 -.10 -.26 .13 -.21 -.35

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

Lower 1962< -.030 1972> -.020 1933> -.017 1884< -.014 2003< -.014 2006> -.010 Higher 1974 .027 1941 .009

1905 to 1934 segment:

Lower 1933> -.116 1909< -.043 1910< -.034 1920< -.034 1928> -.016 1907< -.014 Higher 1929 .105 1924 .045

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

94B 1890 to 2012 123 years Series 12

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

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

1905 1934 0 .28 .02 .35 .05 -.27 .02 .16 -.05 -.23 -.07 .38\*-.06 .13 -.05 .14 .12 -.06 .05 .12 .01 -.32

[B] Entire series, effect on correlation ( .602) is:

Lower 2006> -.023 1909< -.023 1906< -.019 1962< -.017 1983< -.012 1918> -.009 Higher 1974 .032 1996 .013

1905 to 1934 segment:

Lower 1909< -.101 1906< -.088 1918> -.045 1917> -.038 1921< -.033 1927< -.029 Higher 1933 .073 1911 .057

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

95A 1890 to 2012 123 years Series 13

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

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

1890 1919 0 .15 -.06 -.26 -.14 -.04 -.33 .12 .12 .14 .21 .34\* .17 .03 .21 .01 -.22 -.04 -.39 -.22 -.08 -.28

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

1935 1964 0 .15 .11 -.19 -.10 -.15 -.04 -.22 -.10 .09 -.02 .39\*-.01 -.11 .14 .09 -.17 .21 .16 .08 .06 -.03

[B] Entire series, effect on correlation ( .541) is:

Lower 2006> -.020 2002< -.016 1931> -.012 1934> -.012 1894< -.011 1951> -.011 Higher 1974 .062 1972 .015

1890 to 1919 segment:

Lower 1894< -.059 1895> -.047 1915< -.034 1908< -.034 1918> -.032 1890> -.022 Higher 1899 .070 1911 .062

1935 to 1964 segment:

Lower 1951> -.091 1958< -.030 1962> -.029 1959> -.024 1953> -.018 1964> -.016 Higher 1956 .090 1946 .033

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

96A 1922 to 2012 91 years Series 14

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

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1922 1951 -4 -.40 .00 .17 -.02 -.11 .15 .39\* .09 -.01 .30 .39| .09 -.34 -.04 -.11 -.21 -.14 -.36 -.13 -.01 -.03

[B] Entire series, effect on correlation ( .597) is:

Lower 1934< -.067 1926> -.012 1973< -.012 1972> -.012 1960< -.010 1998> -.010 Higher 2006 .017 1974 .017

1922 to 1951 segment:

Lower 1934< -.163 1926> -.043 1933> -.031 1951> -.017 1928> -.014 1936< -.013 Higher 1924 .054 1941 .038

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96B 1935 to 2012 78 years Series 15

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

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1935 1964 0 .10 .39 -.04 -.07 .03 .07 -.08 -.02 .00 -.09 .42\*-.26 -.03 .12 .05 -.24 .00 -.06 .02 .02 .02

[B] Entire series, effect on correlation ( .504) is:

Lower 1944< -.043 1946> -.024 1974> -.024 1979> -.017 1942< -.015 1966> -.015 Higher 1972 .024 2006 .017

1935 to 1964 segment:

Lower 1946> -.091 1944< -.060 1950> -.034 1947> -.018 1959> -.014 1957< -.012 Higher 1956 .085 1961 .048

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

1944 -4.7 SD

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97A 1873 to 2012 140 years Series 16

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

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1905 1934 3 -.21 -.08 -.17 -.45 .14 .23 .09 .03 -.05 .20 .30|-.23 .18 .35\*-.06 -.13 .18 .21 -.06 -.22 .11

1920 1949 0 -.47 -.03 -.13 -.25 .03 .27 .12 .03 -.02 .24 .29\*-.21 .20 .21 .00 -.16 .03 .10 -.17 -.40 -.08

[B] Entire series, effect on correlation ( .503) is:

Lower 1874< -.060 1923< -.039 1971< -.014 2012< -.013 2006> -.011 2008< -.011 Higher 1994 .020 1887 .015

1905 to 1934 segment:

Lower 1923< -.245 1918> -.019 1916< -.018 1932< -.017 1914> -.013 1925> -.012 Higher 1911 .055 1926 .030

1920 to 1949 segment:

Lower 1923< -.265 1932< -.018 1946> -.016 1944> -.013 1943> -.013 1925> -.010 Higher 1941 .033 1920 .032

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

1968 +3.0 SD

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97B 1862 to 2012 151 years Series 17

[B] Entire series, effect on correlation ( .556) is:

Lower 1872< -.024 1974> -.017 1866> -.016 1970< -.016 1959< -.011 1971< -.010 Higher 1875 .013 1887 .011

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98A 1872 to 2012 141 years Series 18

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

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1872 1901 0 -.06 .19 -.30 .25 -.19 .04 .26 .13 .12 -.04 .36\* .10 -.19 -.20 -.19 -.43 .31 -.29 -.26 .27 -.13

1875 1904 0 -.05 .06 -.21 .22 -.10 -.05 .20 .22 .06 -.05 .35\* .20 -.19 -.11 -.25 -.45 .22 -.26 -.35 .30 -.22

[B] Entire series, effect on correlation ( .651) is:

Lower 1878< -.027 1874> -.022 1886< -.019 1903< -.010 1956> -.008 1887> -.008 Higher 1974 .039 1875 .015

1872 to 1901 segment:

Lower 1878< -.117 1886< -.089 1874> -.071 1888> -.019 1877> -.018 1887> -.015 Higher 1875 .142 1894 .042

1875 to 1904 segment:

Lower 1878< -.106 1886< -.076 1903< -.033 1888> -.030 1877> -.027 1887> -.025 Higher 1875 .148 1894 .051

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

1874 +3.0 SD

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98B 1862 to 2012 151 years Series 19

[B] Entire series, effect on correlation ( .656) is:

Lower 1887> -.022 1877< -.016 1871> -.009 1996> -.008 1932< -.008 1863< -.008 Higher 1974 .025 1994 .013

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100A 1893 to 2012 120 years Series 20

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

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1893 1922 0 -.17 -.38 -.18 -.29 -.12 -.05 .29 .31 .08 -.05 .39\*-.01 -.31 .00 -.03 -.28 .13 .06 .26 .20 .01

1905 1934 -4 -.23 -.45 -.18 -.21 -.15 -.11 .43\* .33 -.12 -.02 .41|-.03 -.33 -.01 .28 -.05 .13 .00 .23 -.05 -.22

[B] Entire series, effect on correlation ( .677) is:

Lower 1967> -.013 1922< -.011 1926> -.011 1893> -.010 1920< -.009 1943< -.008 Higher 1974 .040 2006 .012

1893 to 1922 segment:

Lower 1893> -.058 1922< -.048 1920< -.046 1915< -.029 1921< -.026 1907> -.020 Higher 1899 .059 1916 .047

1905 to 1934 segment:

Lower 1926> -.055 1920< -.047 1922< -.043 1915< -.030 1921< -.026 1928> -.022 Higher 1929 .101 1924 .066

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100B 1878 to 2012 135 years Series 21

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

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1878 1907 0 .06 .18 .11 .06 .00 -.23 -.20 -.34 -.25 .13 .30\*-.02 .28 .22 .02 .26 -.09 -.21 -.04 -.37 .05

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1905 1934 4 -.39 -.08 .27 .04 -.15 -.22 .04 .29 -.32 .09 .56| .24 -.23 .14 .60\* .20 -.28 -.08 .27 -.07 -.45

[B] Entire series, effect on correlation ( .520) is:

Lower 1991< -.031 1989> -.021 1882< -.019 1885< -.016 1878> -.013 1911> -.011 Higher 1974 .036 2006 .021

1878 to 1907 segment:

Lower 1882< -.101 1885< -.084 1878> -.061 1881> -.028 1901> -.021 1884< -.013 Higher 1899 .078 1895 .042

1905 to 1934 segment:

Lower 1911> -.099 1933> -.075 1923> -.011 1925< -.010 1910< -.008 1906< -.006 Higher 1929 .067 1924 .031

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

1989 +3.2 SD

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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 ()

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1 89A 1886 2012 127 9 2 .540 1.39 3.41 .765 .929 .199 2.70 .415 -.044 1

2 89B 1881 2012 132 9 2 .461 1.03 2.47 .560 .895 .239 2.70 .449 -.043 2

3 90A 1895 2012 118 8 3 .631 1.89 3.73 .631 .697 .212 2.56 .404 -.066 1

4 90B 1888 2012 125 9 3 .604 1.63 3.56 .638 .780 .219 2.64 .460 -.013 1

5 91A 1879 2012 134 9 1 .616 1.37 4.01 .705 .880 .189 2.44 .365 -.070 1

6 91B 1881 2012 132 9 0 .721 1.69 4.07 .686 .818 .189 2.63 .518 -.040 1

7 92A 1935 2012 78 5 2 .514 1.53 3.45 .743 .792 .252 2.56 .443 -.010 1

8 92B 1935 2012 78 5 0 .704 1.22 2.23 .433 .580 .267 2.58 .457 -.065 1

9 93A 1864 2012 149 10 3 .515 1.05 3.64 .766 .884 .272 2.62 .395 -.080 1

10 93B 1866 2012 147 10 4 .451 .73 3.26 .556 .927 .253 2.58 .341 -.036 1

11 94A 1880 2012 133 9 1 .540 1.21 2.79 .527 .901 .162 2.67 .383 -.039 1

12 94B 1890 2012 123 8 1 .602 1.55 4.16 .866 .905 .176 2.78 .526 -.099 1

13 95A 1890 2012 123 8 2 .541 1.55 4.25 .933 .920 .228 2.51 .400 -.039 1

14 96A 1922 2012 91 6 1 .597 1.34 2.77 .593 .865 .191 2.57 .431 .046 1

15 96B 1935 2012 78 5 1 .504 1.55 3.12 .719 .869 .212 2.62 .481 -.021 1

16 97A 1873 2012 140 10 2 .503 1.03 2.59 .481 .870 .186 2.61 .485 -.010 1

17 97B 1862 2012 151 10 0 .556 1.23 4.49 .769 .914 .181 2.75 .490 .066 1

18 98A 1872 2012 141 10 2 .651 1.48 4.95 .914 .850 .249 2.65 .401 -.112 1

19 98B 1862 2012 151 10 0 .656 1.12 3.14 .577 .874 .231 2.69 .452 .027 4

20 100A 1893 2012 120 8 2 .677 1.22 3.00 .644 .901 .189 2.65 .471 -.044 1

21 100B 1878 2012 135 9 2 .520 1.12 3.03 .633 .912 .198 2.76 .523 -.012 2

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Total or mean: 2606 176 34 .575 1.31 4.95 .676 .863 .213 2.78 .441 -.034

- = [ COFECHA GREE2COF ] = -