[] Dendrochronology Program Library Run GREE4 Program COF 10:36 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: GREE4\_3

File of DATED series: GREE4\_3COMP

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 1886 to 2012 127 years

Continuous time span is 1886 to 2012 127 years

Portion with two or more series is 1887 to 2012 126 years

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

\*C\* Number of dated series 23 \*C\*

\*O\* Master series 1886 2012 127 yrs \*O\*

\*F\* Total rings in all series 2417 \*F\*

\*E\* Total dated rings checked 2416 \*E\*

\*C\* Series intercorrelation .620 \*C\*

\*H\* Average mean sensitivity .207 \*H\*

\*A\* Segments, possible problems 15 \*A\*

\*\*\* Mean length of series 105.1 \*\*\*

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

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

79B 1 absent rings: 1989

1 absent rings .041%

PART 2: TIME PLOT OF TREE-RING SERIES: GREE4\_3 10:36 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

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

. . . . . . . . . . . . . . . . . <============> . 77A 1 1887 2012 126

. . . . . . . . . . . . . . . . . <===========> . 77B 2 1893 2012 120

. . . . . . . . . . . . . . . . . <===========> . 78A 3 1890 2012 123

. . . . . . . . . . . . . . . . . <===========> . 78B 4 1897 2012 116

. . . . . . . . . . . . . . . . . . <=====> . 79A 5 1950 2012 63

. . . . . . . . . . . . . . . . . . <=====> . 79B 6 1950 2012 63

. . . . . . . . . . . . . . . . . <==========> . 80A 7 1903 2012 110

. . . . . . . . . . . . . . . . . . <=======> . 81A 8 1935 2012 78

. . . . . . . . . . . . . . . . . <============> . 81B 9 1886 2012 127

. . . . . . . . . . . . . . . . . <===========> . 82A 10 1898 2012 115

. . . . . . . . . . . . . . . . . <===========> . 82B 11 1898 2012 115

. . . . . . . . . . . . . . . . . <===========> . 83A 12 1897 2012 116

. . . . . . . . . . . . . . . . . <==========> . 83B 13 1904 2012 109

. . . . . . . . . . . . . . . . . <==========> . 84A 14 1900 2012 113

. . . . . . . . . . . . . . . . . <===========> . 84B 15 1899 2012 114

. . . . . . . . . . . . . . . . . <==========> . 85A 16 1904 2012 109

. . . . . . . . . . . . . . . . . . <=======> . 85B 17 1935 2012 78

. . . . . . . . . . . . . . . . . <===========> . 86A 18 1892 2012 121

. . . . . . . . . . . . . . . . . . <=======> . 86B 19 1935 2012 78

. . . . . . . . . . . . . . . . . <===========> . 87A 20 1890 2012 123

. . . . . . . . . . . . . . . . . <============> . 87B 21 1888 2012 125

. . . . . . . . . . . . . . . . . . <=====> . 88A 22 1955 2012 58

. . . . . . . . . . . . . . . . . <===========> . 88B 23 1896 2012 117

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

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: GREE4\_3 10:36 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 1.172 14 1950 -.971 22 2000 -.628 23

1901 .371 14 1951 .264 22 2001 -.129 23

1902 .109 14 1952 .557 22 2002 .417 23

1903 1.080 15 1953 -.980 22 2003 -.743 23

1904 1.134 17 1954 1.331 22 2004 -.516 23

1905 .195 17 1955 1.620 23 2005 -.718 23

1906 .398 17 1956 -.637 23 2006 -3.170 23

1907 -.796 17 1957 .656 23 2007 -1.077 23

1908 .478 17 1958 1.421 23 2008 -.083 23

1909 .103 17 1959 .298 23 2009 .532 23

1910 .663 17 1960 .099 23 2010 2.139 23

1911 -2.434 17 1961 1.995 23 2011 .182 23

1912 -.283 17 1962 .723 23 2012 1.224 23

1913 -.257 17 1963 1.112 23

1914 -.959 17 1964 .272 23

1915 -.326 17 1965 .126 23

1916 .231 17 1966 -1.631 23

1917 -1.169 17 1967 -.922 23

1918 -.852 17 1968 -.239 23

1919 -.150 17 1969 -.167 23

1920 -1.323 17 1970 -.112 23

1921 -1.046 17 1971 .142 23

1922 -.399 17 1972 -1.563 23

1923 -.627 17 1973 -.349 23

1924 1.484 17 1974 -1.596 23

1925 .401 17 1975 -.757 23

1926 -.221 17 1976 -.591 23

1927 .019 17 1977 .979 23

1928 .450 17 1978 1.238 23

1929 -.047 17 1979 .348 23

1930 .665 17 1980 1.768 23

1931 .711 17 1981 -.096 23

1932 1.545 17 1982 .290 23

1933 1.326 17 1983 -.345 23

1934 1.186 17 1984 -1.201 23

1935 .902 20 1985 .213 23

1886 -2.524 1 1936 .726 20 1986 -.387 23

1887 -1.071 2 1937 .102 20 1987 -.131 23

1888 -.797 3 1938 .478 20 1988 -.918 23

1889 -.446 3 1939 .285 20 1989 -.885 23 1

1890 -1.682 5 1940 -.725 20 1990 .156 23

1891 -.173 5 1941 1.047 20 1991 .095 23

1892 .095 6 1942 -.602 20 1992 1.600 23

1893 1.010 7 1943 -2.091 20 1993 2.532 23

1894 .797 7 1944 -.121 20 1994 .796 23

1895 -.780 7 1945 .173 20 1995 1.619 23

1896 1.216 8 1946 -.992 20 1996 -1.249 23

1897 1.255 10 1947 -.710 20 1997 -.032 23

1898 .174 12 1948 -1.867 20 1998 -.685 23

1899 -.944 13 1949 .177 20 1999 1.018 23

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PART 4: Master Bar Plot: GREE4\_3 10:36 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

1900---------E 1950-d 2000--c

1901-------A 1951------A 2001----a

1902-----@ 1952-------B 2002-------B

1903---------D 1953-d 2003--c

1904---------E 1954---------E 2004---b

1905------A 1955----------F 2005--c

1906-------B 1956--c 2006m

1907--c 1957--------C 2007-d

1908-------B 1958----------F 2008----@

1909-----@ 1959------A 2009-------B

1910--------C 1960-----@ 2010----------I

1911j 1961----------H 2011------A

1912----a 1962--------C 2012---------E

1913----a 1963---------D

1914-d 1964------A

1915---a 1965-----A

1916------A 1966g

1917-e 1967-d

1918--c 1968----a

1919----a 1969----a

1920e 1970----@

1921-d 1971-----A

1922---b 1972f

1923--c 1973---a

1924----------F 1974f

1925-------B 1975--c

1926----a 1976---b

1927-----@ 1977---------D

1928-------B 1978---------E

1929----@ 1979-------A

1930--------C 1980----------G

1931--------C 1981----@

1932----------F 1982------A

1933---------E 1983---a

1934---------E 1984-e

1935--------D 1985------A

1886j 1936--------C 1986---b

1887-d 1937-----@ 1987----a

1888--c 1938-------B 1988-d

1889---b 1939------A 1989-d

1890g 1940--c 1990------A

1891----a 1941---------D 1991-----@

1892-----@ 1942--b 1992----------F

1893---------D 1943h 1993----------J

1894--------C 1944----@ 1994--------C

1895--c 1945------A 1995----------F

1896---------E 1946-d 1996-e

1897---------E 1947--c 1997----@

1898------A 1948g 1998--c

1899-d 1949------A 1999---------D

PART 5: CORRELATION OF SERIES BY SEGMENTS: GREE4\_3 10:36 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 1875 1890 1905 1920 1935 1950 1965 1980 1995

1904 1919 1934 1949 1964 1979 1994 2009 2024

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

1 77A 1887 2012 .74 .75 .69 .42A .57 .74 .67 .60 .62

2 77B 1893 2012 .47B .47 .46 .48 .65 .72 .48 .50

3 78A 1890 2012 .48 .74 .82 .78 .75 .52 .64 .68

4 78B 1897 2012 .49 .44 .80 .82 .68 .54B .53 .59

5 79A 1950 2012 .72 .63 .70 .73

6 79B 1950 2012 .55 .79 .72 .67

7 80A 1903 2012 .56 .51 .34B .41B .60 .62 .70 .68

8 81A 1935 2012 .53 .54 .41A .68 .68

9 81B 1886 2012 .50 .59 .56 .57 .73 .64 .61 .68 .67

10 82A 1898 2012 .44 .56 .40A .80 .84 .75 .65 .70

11 82B 1898 2012 .73 .73 .50 .59 .47 .47 .75 .76

12 83A 1897 2012 .71 .81 .65 .68 .73 .80 .79 .78

13 83B 1904 2012 .78 .73 .59 .70 .81 .77 .77 .78

14 84A 1900 2012 .43 .44 .52 .58 .42 .47 .75 .79

15 84B 1899 2012 .67 .67 .80 .70 .51 .53 .69 .76

16 85A 1904 2012 .31B .42A .40A .58 .62 .65 .88 .89

17 85B 1935 2012 .46 .70 .69 .76 .76

18 86A 1892 2012 .52 .47B .68 .71 .66 .57 .62 .67

19 86B 1935 2012 .56 .42A .33A .62 .66

20 87A 1890 2012 .45 .55 .69 .68 .63 .69 .85 .86

21 87B 1888 2012 .36B .46 .53 .66 .56 .38B .44 .85 .84

22 88A 1955 2012 .50 .53 .80 .82

23 88B 1896 2012 .61 .47 .50 .59 .58 .62 .84 .83

Av segment correlation .53 .56 .58 .58 .63 .61 .60 .71 .73

PART 6: POTENTIAL PROBLEMS: GREE4\_3 10:36 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

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77A 1887 to 2012 126 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

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

1920 1949 0 -.04 .22 -.40 .06 .24 -.31 .16 .35 -.04 .33 .42\*-.17 .22 .13 .11 -.18 .17 .05 -.04 -.20 .19

[B] Entire series, effect on correlation ( .637) is:

Lower 1986> -.012 1926> -.012 1996> -.011 1999< -.010 1984> -.009 1949< -.007 Higher 1911 .044 2006 .035

1920 to 1949 segment:

Lower 1926> -.055 1949< -.033 1944< -.027 1929< -.024 1924< -.018 1927< -.016 Higher 1940 .031 1920 .031

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

1986 +3.2 SD

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

77B 1893 to 2012 120 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

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

1893 1922 6 - - - -.06 .00 -.35 .15 .27 -.44 -.16 .47|-.16 -.08 .01 .01 -.02 .50\*-.22 .28 .21 -.13

[B] Entire series, effect on correlation ( .512) is:

Lower 1996> -.020 1948> -.017 1903< -.012 2002< -.011 1953< -.011 1895> -.010 Higher 1966 .019 1993 .012

1893 to 1922 segment:

Lower 1903< -.063 1895> -.036 1894< -.031 1905< -.030 1913> -.016 1917> -.013 Higher 1911 .069 1896 .032

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78A 1890 to 2012 123 years Series 3

[B] Entire series, effect on correlation ( .652) is:

Lower 1988< -.043 1899> -.033 1986> -.011 1895> -.008 1989> -.006 1952< -.006 Higher 2006 .022 1996 .012

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78B 1897 to 2012 116 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

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

1965 1994 2 .21 -.12 .21 .22 -.02 -.08 -.42 -.29 -.19 -.12 .54| .13 .58\*-.04 -.26 -.06 -.08 .14 -.02 .10 .07

[B] Entire series, effect on correlation ( .624) is:

Lower 1994< -.029 1911> -.017 1908< -.012 1955< -.010 1982< -.007 2006> -.007 Higher 1943 .021 1948 .012

1965 to 1994 segment:

Lower 1994< -.112 1982< -.026 1966> -.021 1988> -.016 1973< -.015 1972> -.012 Higher 1992 .049 1974 .044

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79A 1950 to 2012 63 years Series 5

[B] Entire series, effect on correlation ( .698) is:

Lower 2006> -.033 1966> -.023 1970> -.018 1953< -.013 2005< -.010 1959< -.009 Higher 1996 .023 1972 .015

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79B 1950 to 2012 63 years Series 6

[B] Entire series, effect on correlation ( .620) is:

Lower 1956> -.038 2006> -.033 1989< -.020 1954< -.017 1964> -.008 1971< -.006 Higher 1996 .045 1966 .021

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

1989 -.885 23 1

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

80A 1903 to 2012 110 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

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

1920 1949 3 -.30 .03 -.11 -.33 .07 .03 -.34 .22 -.12 -.05 .34|-.25 .03 .54\*-.24 -.05 .12 -.01 .35 -.20 .12

1935 1964 3 -.18 -.16 -.04 .05 -.03 .02 -.12 .39 .18 -.12 .41|-.11 .05 .47\*-.24 -.07 .17 -.01 .17 -.40 .08

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

Lower 1940< -.044 1956> -.016 1945< -.015 2005> -.011 1948> -.011 1921> -.009 Higher 1911 .025 1996 .024

1920 to 1949 segment:

Lower 1948> -.037 1945< -.036 1920> -.029 1921> -.026 1931< -.022 1934< -.020 Higher 1924 .071 1943 .068

1935 to 1964 segment:

Lower 1940< -.077 1956> -.050 1945< -.036 1948> -.034 1951< -.020 1949< -.010 Higher 1943 .060 1961 .042

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

81A 1935 to 2012 78 years Series 8

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

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

1965 1994 0 .06 -.16 -.02 -.02 -.36 -.32 -.11 -.20 .29 .24 .41\* .13 .16 -.24 -.21 .03 -.05 -.10 -.03 -.07 -.22

[B] Entire series, effect on correlation ( .587) is:

Lower 1972> -.018 1969> -.016 1940> -.015 1948> -.015 1939> -.013 1949< -.013 Higher 2006 .083 1943 .021

1965 to 1994 segment:

Lower 1972> -.056 1969> -.044 1970< -.028 1984> -.021 1986< -.020 1988> -.019 Higher 1980 .067 1966 .050

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

1969 +3.2 SD

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81B 1886 to 2012 127 years Series 9

[\*] Early part of series cannot be checked from 1886 to 1886 -- not matched by another series

[B] Entire series, effect on correlation ( .566) is:

Lower 1909< -.025 1915< -.023 1972> -.023 1888> -.023 1903< -.018 1996> -.011 Higher 1911 .043 1966 .011

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82A 1898 to 2012 115 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

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

1920 1949 0 -.19 -.19 .22 .03 -.15 .19 .28 .14 -.03 -.25 .40\* .20 -.06 .07 .09 -.16 .15 -.30 .02 -.02 .07

[B] Entire series, effect on correlation ( .629) is:

Lower 2001< -.045 1899> -.022 1920> -.020 1925< -.017 1903< -.015 1934< -.012 Higher 1911 .043 2006 .037

1920 to 1949 segment:

Lower 1920> -.077 1925< -.073 1934< -.060 1930< -.031 1948> -.018 1937> -.017 Higher 1943 .060 1924 .056

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82B 1898 to 2012 115 years Series 11

[B] Entire series, effect on correlation ( .638) is:

Lower 1925< -.022 1943> -.011 1953> -.009 1948> -.009 1974> -.008 1898> -.008 Higher 1911 .050 2006 .030

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83A 1897 to 2012 116 years Series 12

[B] Entire series, effect on correlation ( .710) is:

Lower 1948> -.022 1898< -.018 1922< -.016 1899> -.010 1957< -.008 1965> -.006 Higher 1911 .038 1943 .017

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83B 1904 to 2012 109 years Series 13

[B] Entire series, effect on correlation ( .748) is:

Lower 1914> -.015 1960> -.011 1934< -.011 1945< -.009 1943> -.005 1948> -.005 Higher 1911 .034 2006 .011

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84A 1900 to 2012 113 years Series 14

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

Lower 1942> -.031 1973< -.030 1935< -.024 1972> -.011 1907> -.010 1974> -.009 Higher 1943 .032 1911 .022

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

1942 +3.6 SD

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84B 1899 to 2012 114 years Series 15

[B] Entire series, effect on correlation ( .662) is:

Lower 1914> -.018 1956> -.017 2006> -.017 1966> -.015 1982< -.011 1974> -.009 Higher 1943 .021 1996 .017

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85A 1904 to 2012 109 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

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

1904 1933 -6 .09 .16 .07 -.11 .32\* .15 -.17 .09 -.01 -.36 .31|-.10 -.25 .02 .12 -.27 -.08 .18 -.32 .16 .19

1905 1934 0 .17 .08 .16 -.04 .34 .05 -.07 .12 .02 -.29 .42\*-.11 -.25 -.06 .18 -.28 -.06 -.07 -.34 .08 .14

1920 1949 0 .09 .11 .36 .05 .21 .34 .13 .25 .05 -.04 .40\* .03 -.02 -.15 -.01 -.05 -.37 .16 -.11 -.19 .08

[B] Entire series, effect on correlation ( .625) is:

Lower 1904< -.030 1933< -.025 1911> -.021 1937> -.015 1971< -.014 1930< -.011 Higher 2006 .040 1996 .025

1904 to 1933 segment:

Lower 1904< -.105 1933< -.087 1930< -.037 1922< -.015 1911> -.014 1928< -.013 Higher 1924 .069 1917 .055

1905 to 1934 segment:

Lower 1933< -.111 1930< -.047 1911> -.043 1922< -.021 1928< -.018 1914> -.008 Higher 1924 .059 1917 .038

1920 to 1949 segment:

Lower 1933< -.099 1937> -.066 1930< -.040 1940> -.034 1942> -.020 1922< -.016 Higher 1948 .113 1924 .069

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85B 1935 to 2012 78 years Series 17

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

Lower 1984< -.023 1935< -.018 1948> -.017 1936< -.011 1973> -.010 1954< -.008 Higher 2006 .027 1996 .021

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86A 1892 to 2012 121 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

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

1905 1934 -6 .05 .18 .06 .06 .55\*-.01 -.09 .35 -.02 .03 .47|-.10 .01 .23 .13 -.31 -.03 -.18 -.21 -.11 -.20

[B] Entire series, effect on correlation ( .603) is:

Lower 1911> -.019 1926< -.014 1996> -.013 1981> -.012 1901< -.011 2004> -.007 Higher 2006 .026 1943 .017

1905 to 1934 segment:

Lower 1911> -.096 1926< -.053 1924< -.031 1906> -.014 1929> -.010 1919< -.008 Higher 1917 .034 1932 .019

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86B 1935 to 2012 78 years Series 19

[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 1979 0 .18 -.02 .22 .17 .08 .14 -.05 .28 -.21 -.16 .42\*-.32 .00 .09 -.14 -.24 -.04 .14 -.04 .15 .20

1965 1994 0 .31 .14 .17 .08 -.09 .15 -.21 .27 .10 .18 .33\*-.28 -.08 -.34 -.10 .06 -.12 .23 -.14 .07 .18

[B] Entire series, effect on correlation ( .486) is:

Lower 1937< -.034 1945< -.022 1977< -.021 1946> -.017 1988> -.014 1966> -.013 Higher 1943 .048 1948 .026

1950 to 1979 segment:

Lower 1977< -.062 1966> -.047 1964< -.036 1950> -.020 1963< -.015 1972> -.015 Higher 1961 .061 1953 .054

1965 to 1994 segment:

Lower 1977< -.100 1988> -.038 1979< -.023 1983> -.019 1975< -.018 1981> -.016 Higher 1984 .075 1993 .072

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

87A 1890 to 2012 123 years Series 20

[B] Entire series, effect on correlation ( .655) is:

Lower 1899> -.033 1906< -.016 1962< -.015 1904< -.008 1914> -.007 1946> -.007 Higher 2006 .023 1996 .017

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

1899 +3.1 SD

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87B 1888 to 2012 125 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

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

1888 1917 -2 - - - - - - - - .42\*-.24 .36| .18 .12 .13 .12 .01 -.06 .31 -.39 .11 .03

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

1950 1979 -6 -.09 -.04 .11 .06 .41\* .00 .15 .05 .06 -.14 .38| .04 .24 -.03 .06 -.38 -.12 -.10 -.22 .03 .03

[B] Entire series, effect on correlation ( .560) is:

Lower 1899> -.018 1972< -.017 1888< -.015 1939< -.011 1978< -.010 1966> -.009 Higher 2006 .053 1996 .026

1888 to 1917 segment:

Lower 1888< -.101 1899> -.076 1913< -.025 1908< -.024 1910< -.024 1897< -.018 Higher 1911 .157 1896 .052

1950 to 1979 segment:

Lower 1966> -.043 1953> -.034 1978< -.028 1974> -.025 1956> -.025 1952< -.020 Higher 1972 .120 1961 .074

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88A 1955 to 2012 58 years Series 22

[B] Entire series, effect on correlation ( .706) is:

Lower 1966> -.038 1984> -.019 1961< -.017 1967> -.010 2003> -.009 1977< -.009 Higher 2006 .077 1996 .030

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88B 1896 to 2012 117 years Series 23

[B] Entire series, effect on correlation ( .664) is:

Lower 1953> -.019 2012< -.014 1967< -.010 1926> -.008 1986< -.008 1988> -.007 Higher 2006 .043 1996 .020

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PART 7: DESCRIPTIVE STATISTICS: GREE4\_3 10:36 Mon 11 Mar 2013 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 77A 1887 2012 126 9 1 .637 1.97 7.21 1.681 .975 .192 2.63 .436 -.039 2

2 77B 1893 2012 120 8 1 .512 2.17 7.03 1.311 .903 .229 2.59 .432 -.071 1

3 78A 1890 2012 123 8 0 .652 1.53 6.51 1.324 .964 .176 2.66 .398 -.038 1

4 78B 1897 2012 116 8 1 .624 1.13 6.53 1.432 .977 .182 2.62 .452 -.012 2

5 79A 1950 2012 63 4 0 .698 .78 1.82 .455 .856 .245 2.68 .581 -.051 1

6 79B 1950 2012 63 4 0 .620 .46 1.20 .309 .813 .396 2.79 .516 -.050 1

7 80A 1903 2012 110 8 2 .555 1.27 7.21 1.285 .956 .222 2.69 .383 -.093 2

8 81A 1935 2012 78 5 1 .587 .91 1.99 .324 .819 .142 2.77 .405 -.039 1

9 81B 1886 2012 127 9 0 .566 1.82 7.09 1.598 .957 .196 2.63 .514 -.033 1

10 82A 1898 2012 115 8 1 .629 1.26 5.74 .903 .970 .149 2.63 .513 -.054 2

11 82B 1898 2012 115 8 0 .638 1.26 5.43 .966 .956 .176 2.63 .390 -.025 1

12 83A 1897 2012 116 8 0 .710 1.22 4.93 1.081 .947 .250 2.58 .401 -.040 2

13 83B 1904 2012 109 8 0 .748 1.50 5.13 .948 .905 .249 2.73 .473 -.037 1

14 84A 1900 2012 113 8 0 .514 1.30 5.08 1.184 .955 .213 2.79 .437 -.078 1

15 84B 1899 2012 114 8 0 .662 1.35 5.30 1.183 .975 .183 2.81 .498 .021 2

16 85A 1904 2012 109 8 3 .625 1.49 4.35 .903 .920 .205 2.66 .553 -.082 1

17 85B 1935 2012 78 5 0 .649 1.54 3.07 .430 .485 .209 2.72 .482 .021 1

18 86A 1892 2012 121 8 1 .603 1.07 4.35 1.023 .977 .191 2.58 .428 -.037 1

19 86B 1935 2012 78 5 2 .486 .72 2.19 .414 .831 .238 2.58 .553 -.103 2

20 87A 1890 2012 123 8 0 .655 1.38 5.83 1.156 .941 .184 2.61 .409 -.031 1

21 87B 1888 2012 125 9 2 .560 1.00 4.63 1.249 .980 .193 2.55 .344 -.046 1

22 88A 1955 2012 58 4 0 .706 1.02 2.28 .379 .603 .235 2.62 .480 -.080 1

23 88B 1896 2012 117 8 0 .664 1.99 5.77 1.266 .914 .214 2.55 .417 -.041 2

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Total or mean: 2417 166 15 .620 1.36 7.21 1.069 .914 .207 2.81 .450 -.044

- = [ COFECHA GREE4COF ] = -