[] Dendrochronology Program Library Run 92 Program COF 10:20 Mon 25 Apr 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27875

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: 92\_KIL

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 1861 to 2010 150 years

Continuous time span is 1861 to 2010 150 years

Portion with two or more series is 1890 to 2010 121 years

>> 392A 1969 absent in 2 of 20 series, but is not usually narrow: master index is -.084

>> 392A 1970 absent in 2 of 20 series, but is not usually narrow: master index is .458

>> 392A 1971 absent in 1 of 20 series, but is not usually narrow: master index is 1.200

>> 392B 1969 absent in 2 of 20 series, but is not usually narrow: master index is -.084

>> 392B 1970 absent in 2 of 20 series, but is not usually narrow: master index is .458

>> 401B 1997 absent in 1 of 20 series, but is not usually narrow: master index is -.014

>> 401B 1998 absent in 1 of 20 series, but is not usually narrow: master index is .307

>> 401B 1999 absent in 1 of 20 series, but is not usually narrow: master index is 1.145

>> 401B 2000 absent in 1 of 20 series, but is not usually narrow: master index is -.050

>> 401B 2001 absent in 1 of 20 series, but is not usually narrow: master index is 1.545

>> 401B 2002 absent in 1 of 20 series, but is not usually narrow: master index is 1.240

>> 401B 2007 absent in 1 of 20 series, but is not usually narrow: master index is .447

>> 401B 2008 absent in 1 of 20 series, but is not usually narrow: master index is -.054

>> 401B 2009 absent in 1 of 20 series, but is not usually narrow: master index is -.147

>> 401B 2010 absent in 1 of 20 series, but is not usually narrow: master index is 1.471

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

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

\*O\* Master series 1861 2010 150 yrs \*O\*

\*F\* Total rings in all series 1931 \*F\*

\*E\* Total dated rings checked 1902 \*E\*

\*C\* Series intercorrelation .613 \*C\*

\*H\* Average mean sensitivity .273 \*H\*

\*A\* Segments, possible problems 21 \*A\*

\*\*\* Mean length of series 96.6 \*\*\*

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

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

392A 6 absent rings: 1966 1967 1968 1969 1970 1971

392B 8 absent rings: 1963 1964 1965 1966 1967 1968 1969 1970

393B 1 absent rings: 1963

395A 2 absent rings: 1964 1965

396A 3 absent rings: 1964 1965 1966

401B 15 absent rings: 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

528B 1 absent rings: 1964

36 absent rings 1.864%

PART 2: TIME PLOT OF TREE-RING SERIES: 10:20 Mon 25 Apr 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

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

. . . . . . . . . . . . . . . . . . <========> . 392A 1 1924 2010 87

. . . . . . . . . . . . . . . . . . <========> . 392B 2 1925 2010 86

. . . . . . . . . . . . . . . . . <===========> . 393A 3 1890 2010 121

. . . . . . . . . . . . . . . . . .<=========> . 393B 4 1910 2010 101

. . . . . . . . . . . . . . . . . .<=========> . 394A 5 1919 2010 92

. . . . . . . . . . . . . . . . . <==========> . 394B 6 1909 2010 102

. . . . . . . . . . . . . . . . . <==========> . 395A 7 1905 2010 106

. . . . . . . . . . . . . . . . . . <========> . 395B 8 1926 2010 85

. . . . . . . . . . . . . . . . . . <========> . 396A 9 1921 2010 90

. . . . . . . . . . . . . . . . . . <========> . 396B 10 1924 2010 87

. . . . . . . . . . . . . . . . . .<=========> . 397A 11 1913 2010 98

. . . . . . . . . . . . . . . . . .<=========> . 397B 12 1918 2010 93

. . . . . . . . . . . . . . . . . . <======> . 399A 13 1940 2010 71

. . . . . . . . . . . . . . . . . . <======> . 399B 14 1946 2010 65

. . . . . . . . . . . . . . . . . . <========> . 400A 15 1926 2010 85

. . . . . . . . . . . . . . . . . .<=========> . 400B 16 1912 2010 99

. . . . . . . . . . . . . . . . . <==========> . 401A 17 1906 2010 105

. . . . . . . . . . . . . . . . .<==============> . 401B 18 1861 2010 150

. . . . . . . . . . . . . . . . . <==========> . 528A 19 1905 2010 106

. . . . . . . . . . . . . . . . . <==========> . 528B 20 1909 2010 102

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

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: 10:20 Mon 25 Apr 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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1900 1.478 2 1950 -.412 20 2000 -.050 20 1<<

1901 -.664 2 1951 .184 20 2001 1.545 20 1<<

1902 .241 2 1952 .456 20 2002 1.240 20 1<<

1903 .302 2 1953 .162 20 2003 -1.566 20 1

1904 1.566 2 1954 .777 20 2004 -1.818 20 1

1905 -.477 4 1955 1.625 20 2005 -1.619 20 1

1906 -.573 5 1956 -.131 20 2006 -1.041 20 1

1907 -.563 5 1957 .795 20 2007 .447 20 1<<

1908 -.455 5 1958 1.522 20 2008 -.054 20 1<<

1909 -1.141 7 1959 .140 20 2009 -.147 20 1<<

1910 -.029 8 1960 -.440 20 2010 1.471 20 1<<

1861 1.294 1 1911 -.940 8 1961 .659 20

1862 -1.742 1 1912 .254 9 1962 -.742 20

1863 -1.584 1 1913 .004 10 1963 -.865 20 2

1864 -.792 1 1914 .260 10 1964 -1.552 20 4

1865 .209 1 1915 .322 10 1965 -1.728 20 3

1866 1.655 1 1916 .973 10 1966 -1.861 20 3

1867 1.412 1 1917 -.805 10 1967 -1.078 20 2

1868 .995 1 1918 -.381 11 1968 -1.057 20 2

1869 1.142 1 1919 .942 12 1969 -.084 20 2<<

1870 1.292 1 1920 -.777 12 1970 .458 20 2<<

1871 .928 1 1921 .580 13 1971 1.200 20 1<<

1872 1.096 1 1922 .579 13 1972 .154 20

1873 -2.253 1 1923 .365 13 1973 .249 20

1874 .238 1 1924 1.310 15 1974 .506 20

1875 .255 1 1925 -.292 16 1975 1.074 20

1876 -.612 1 1926 .234 18 1976 -.506 20

1877 -1.926 1 1927 -.139 18 1977 -.840 20

1878 .370 1 1928 .675 18 1978 -.183 20

1879 -2.777 1 1929 -.392 18 1979 .070 20

1880 -1.452 1 1930 .201 18 1980 1.023 20

1881 -1.332 1 1931 .377 18 1981 -.762 20

1882 -2.166 1 1932 .515 18 1982 .154 20

1883 -.175 1 1933 -.150 18 1983 .146 20

1884 2.135 1 1934 1.181 18 1984 -.437 20

1885 1.537 1 1935 -2.250 18 1985 -.707 20

1886 .905 1 1936 -1.195 18 1986 -.941 20

1887 -2.400 1 1937 -.357 18 1987 .763 20

1888 -1.408 1 1938 .219 18 1988 .868 20

1889 -.266 1 1939 .784 18 1989 -.221 20

1890 1.188 2 1940 -1.404 19 1990 1.048 20

1891 1.031 2 1941 .950 19 1991 .949 20

1892 .591 2 1942 .935 19 1992 .343 20

1893 -1.109 2 1943 -.369 19 1993 1.188 20

1894 -.263 2 1944 .707 19 1994 -.115 20

1895 -.296 2 1945 -.180 19 1995 .508 20

1896 -.523 2 1946 -.843 20 1996 -1.445 20 1

1897 -.105 2 1947 .417 20 1997 -.014 20 1<<

1898 1.284 2 1948 -.940 20 1998 .307 20 1<<

1899 1.143 2 1949 .665 20 1999 1.145 20 1<<

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PART 4: Master Bar Plot: 10:20 Mon 25 Apr 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

1900----------F 1950---b 2000----@

1901--c 1951-----A 2001----------F

1902------A 1952-------B 2002---------E

1903------A 1953-----A 2003f

1904----------F 1954--------C 2004g

1905---b 1955----------G 2005f

1906---b 1956----a 2006-d

1907---b 1957--------C 2007-------B

1908---b 1958----------F 2008----@

1909-e 1959-----A 2009----a

1910----@ 1960---b 2010----------F

1861---------E 1911--d 1961-------C

1862g 1912------A 1962--c

1863f 1913-----@ 1963--c

1864--c 1914------A 1964f

1865-----A 1915------A 1965g

1866----------G 1916--------D 1966g

1867----------F 1917--c 1967-d

1868--------D 1918---b 1968-d

1869---------E 1919--------D 1969----@

1870---------E 1920--c 1970-------B

1871--------D 1921-------B 1971---------E

1872---------D 1922-------B 1972-----A

1873i 1923------A 1973------A

1874------A 1924---------E 1974-------B

1875------A 1925---a 1975---------D

1876--b 1926------A 1976---b

1877h 1927----a 1977--c

1878------A 1928-------C 1978----a

1879k 1929---b 1979-----@

1880-f 1930-----A 1980--------D

1881-e 1931------B 1981--c

1882i 1932-------B 1982-----A

1883----a 1933----a 1983-----A

1884----------I 1934---------E 1984---b

1885----------F 1935i 1985--c

1886--------D 1936-e 1986--d

1887j 1937---a 1987--------C

1888-f 1938-----A 1988--------C

1889----a 1939--------C 1989----a

1890---------E 1940-f 1990---------D

1891--------D 1941--------D 1991--------D

1892-------B 1942--------D 1992------A

1893-d 1943---a 1993---------E

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

1895---a 1945----a 1995-------B

1896---b 1946--c 1996-f

1897----@ 1947-------B 1997----@

1898---------E 1948--d 1998------A

1899---------E 1949-------C 1999---------E

PART 5: CORRELATION OF SERIES BY SEGMENTS: 10:20 Mon 25 Apr 2011 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 1890 1905 1920 1935 1950 1965 1980 1995

1919 1934 1949 1964 1979 1994 2009 2024

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

1 392A 1924 2010 .27B .28B .40A .48B .76 .77

2 392B 1925 2010 .66 .66 .29B .35B .34A .35A

3 393A 1890 2010 .44 .46 .73 .83 .56 .55 .78 .78

4 393B 1910 2010 .78 .83 .72 .43 .60 .74 .75

5 394A 1919 2010 .59 .58B .69 .69 .58 .58 .59

6 394B 1909 2010 .43 .45B .59 .62 .48 .60 .64

7 395A 1905 2010 .37A .71 .72 .52 .32B .65 .64

8 395B 1926 2010 .70 .76 .68 .71 .87 .87

9 396A 1921 2010 .40A .61 .48B .48 .67 .69

10 396B 1924 2010 .27B .50 .70 .66 .75 .75

11 397A 1913 2010 .59 .72 .83 .73 .66 .51 .49

12 397B 1918 2010 .70 .74 .77 .69 .76 .74 .74

13 399A 1940 2010 .40A .57 .61 .78 .79

14 399B 1946 2010 .17B .22B .45 .63 .65

15 400A 1926 2010 .75 .79 .68 .61 .67 .70

16 400B 1912 2010 .58 .67 .84 .65 .54 .61 .64

17 401A 1906 2010 .54 .79 .85 .84 .68 .79 .79

18 401B 1861 2010 .40A .56 .69 .77 .79 .61 .56 .55

19 528A 1905 2010 .29B .56B .66 .86 .68 .83 .84

20 528B 1909 2010 .61 .70 .84 .69 .57 .73 .75

Av segment correlation .42 .54 .62 .66 .60 .57 .68 .69

PART 6: POTENTIAL PROBLEMS: 10:20 Mon 25 Apr 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 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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392A 1924 to 2010 87 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

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

1924 1953 -2 .18 -.26 .15 .10 -.18 .28 -.03 -.29 .37\*-.08 .27|-.34 -.06 .07 .16 -.10 .10 -.34 -.05 -.04 .10

1935 1964 3 .16 -.34 .09 .12 -.24 .16 .01 -.22 .34 .03 .28|-.16 .08 .42\* .00 -.21 .20 -.42 -.04 -.31 -.16

1950 1979 0 .07 -.12 -.03 .01 .04 -.16 .37 -.16 .23 .13 .40\* .06 .37 .20 .30 -.01 -.11 -.31 -.20 -.49 -.19

1965 1994 -5 .24 .19 .04 -.26 .05 .48\*-.26 -.24 .04 -.03 .48|-.31 .20 .26 .04 -.10 -.16 -.16 -.03 .26 -.01

[B] Entire series, effect on correlation ( .488) is:

Lower 1935> -.127 1956> -.022 1971< -.021 1937< -.015 1984> -.014 1931< -.013 Higher 2003 .075 1940 .022

1924 to 1953 segment:

Lower 1935> -.321 1937< -.041 1931< -.036 1947< -.019 1942< -.016 1929> -.015 Higher 1940 .101 1948 .032

1935 to 1964 segment:

Lower 1935> -.305 1956> -.048 1937< -.043 1947< -.016 1959> -.014 1942< -.013 Higher 1940 .086 1964 .031

1950 to 1979 segment:

Lower 1956> -.115 1971< -.086 1970< -.042 1959> -.038 1977> -.033 1969< -.022 Higher 1964 .061 1966 .053

1965 to 1994 segment:

Lower 1971< -.083 1984> -.071 1970< -.038 1982< -.033 1977> -.032 1989> -.027 Higher 1990 .055 1993 .054

[D] 6 Absent rings: Year Master N series Absent

1966 -1.861 20 3

1967 -1.078 20 2

1968 -1.057 20 2

1969 -.084 20 2 >> WARNING: Ring is not usually narrow

1970 .458 20 2 >> WARNING: Ring is not usually narrow

1971 1.200 20 1 >> WARNING: Ring is not usually narrow

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

1935 +5.2 SD; 1971 -5.0 SD

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392B 1925 to 2010 86 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

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

1950 1979 -10 .54\*-.02 -.01 .19 -.03 -.22 .12 -.16 -.01 .06 .29|-.24 .09 .09 .29 -.25 .03 -.21 -.27 .06 -.34

1965 1994 -10 .46\* .16 .13 -.12 -.11 .09 -.27 -.25 .02 .02 .35|-.23 .14 .09 .18 -.18 .10 -.07 .00 .45 -.05

1980 2009 0 -.10 .16 -.11 -.35 .31 .27 .02 -.15 -.10 .10 .34\*-.17 - - - - - - - - -

1981 2010 0 -.14 .18 -.07 -.39 .25 .21 .03 -.11 -.11 .10 .35\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .465) is:

Lower 2009< -.062 1995< -.018 1981> -.016 2003> -.016 1956> -.014 1959> -.011 Higher 1940 .032 1935 .024

1950 to 1979 segment:

Lower 1956> -.074 1959> -.058 1973< -.035 1975< -.034 1970< -.023 1979< -.022 Higher 1971 .071 1955 .043

1965 to 1994 segment:

Lower 1981> -.085 1975< -.042 1973< -.038 1984> -.035 1970< -.026 1979< -.024 Higher 1971 .064 1993 .043

1980 to 2009 segment:

Lower 2009< -.166 1995< -.045 1981> -.037 2003> -.024 2006> -.017 1984> -.015 Higher 1996 .039 2001 .036

1981 to 2010 segment:

Lower 2009< -.166 1995< -.044 1981> -.036 2003> -.025 2006> -.017 1984> -.015 Higher 1996 .038 2001 .034

[D] 8 Absent rings: Year Master N series Absent

1963 -.865 20 2

1964 -1.552 20 4

1965 -1.728 20 3

1966 -1.861 20 3

1967 -1.078 20 2

1968 -1.057 20 2

1969 -.084 20 2 >> WARNING: Ring is not usually narrow

1970 .458 20 2 >> WARNING: Ring is not usually narrow

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

2009 -6.0 SD

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393A 1890 to 2010 121 years Series 3

[B] Entire series, effect on correlation ( .643) is:

Lower 1896< -.020 1930< -.017 1894< -.014 1912< -.014 1925> -.011 1900< -.010 Higher 1935 .061 2003 .023

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

1912 -4.6 SD

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393B 1910 to 2010 101 years Series 4

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

Lower 1961< -.022 1950> -.022 1993< -.021 1996> -.008 1916> -.008 1941< -.006 Higher 1935 .067 2003 .021

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

1963 -.865 20 2

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

1916 +3.3 SD; 1950 +3.3 SD; 1951 +3.0 SD

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394A 1919 to 2010 92 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

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

1920 1949 10 .04 -.34 .25 -.21 -.11 .33 -.25 .24 -.10 -.19 .58|-.31 .23 -.21 -.08 .04 -.09 -.05 .04 -.45 .60\*

[B] Entire series, effect on correlation ( .614) is:

Lower 1989< -.014 1981> -.012 2003> -.012 1920> -.011 1925< -.010 1938< -.010 Higher 1935 .016 1940 .011

1920 to 1949 segment:

Lower 1925< -.044 1920> -.029 1938< -.027 1923< -.023 1927> -.018 1943> -.014 Higher 1935 .064 1940 .034

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394B 1909 to 2010 102 years Series 6

[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 -8 .17 -.41 .50\*-.05 -.14 .08 -.23 .38 -.26 -.21 .45|-.37 .29 .07 -.17 .12 -.22 -.09 .24 -.47 .15

[B] Entire series, effect on correlation ( .549) is:

Lower 1921< -.022 1932< -.012 1920> -.012 1997< -.009 1994> -.009 1914> -.008 Higher 1996 .012 1917 .011

1920 to 1949 segment:

Lower 1921< -.058 1920> -.033 1932< -.032 1923< -.017 1937> -.009 1947< -.006 Higher 1935 .049 1948 .021

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395A 1905 to 2010 106 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

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

1905 1934 0 -.09 -.16 -.01 -.08 .15 -.25 .05 .17 .15 -.21 .37\*-.39 .21 .11 -.01 .11 -.01 .00 .11 -.11 .23

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

1965 1994 8 .00 .11 .27 .30 .05 -.01 -.01 .11 -.01 -.24 .32|-.12 -.13 -.37 .35 .13 -.08 -.24 .38\* .12 -.24

[B] Entire series, effect on correlation ( .608) is:

Lower 1905> -.021 1932< -.017 1981> -.015 1906> -.010 1986> -.010 1946> -.010 Higher 1935 .085 2003 .018

1905 to 1934 segment:

Lower 1905> -.090 1932< -.077 1906> -.040 1914> -.031 1907< -.012 1913> -.011 Higher 1920 .062 1924 .061

1965 to 1994 segment:

Lower 1981> -.071 1986> -.053 1988< -.043 1974< -.036 1991< -.025 1992< -.025 Higher 1993 .059 1987 .057

[D] 2 Absent rings: Year Master N series Absent

1964 -1.552 20 4

1965 -1.728 20 3

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395B 1926 to 2010 85 years Series 8

[B] Entire series, effect on correlation ( .758) is:

Lower 1970< -.021 1944< -.013 1959> -.010 1936> -.010 1940> -.010 1926> -.008 Higher 1935 .032 2003 .025

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396A 1921 to 2010 90 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

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

1921 1950 0 .11 -.20 .09 -.04 .01 .11 -.04 -.29 .39 -.40 .40\* .17 -.24 .14 .01 .31 -.16 -.19 .01 .13 .03

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

1950 1979 3 .19 -.28 -.24 -.21 -.24 -.17 -.28 .19 .01 -.12 .48| .05 -.25 .64\* .05 -.29 .37 .06 -.22 .10 -.08

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

Lower 1931< -.034 1922< -.021 1940> -.018 1948> -.017 1929> -.016 1942< -.013 Higher 1935 .117 2003 .014

1921 to 1950 segment:

Lower 1931< -.064 1940> -.043 1922< -.040 1948> -.038 1929> -.034 1942< -.026 Higher 1935 .455 1941 .022

1950 to 1979 segment:

Lower 1953< -.077 1975< -.053 1977> -.042 1976> -.028 1961< -.027 1978< -.026 Higher 1958 .045 1971 .037

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

1964 -1.552 20 4

1965 -1.728 20 3

1966 -1.861 20 3

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

1935 -5.1 SD

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

396B 1924 to 2010 87 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

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

1924 1953 8 .22 .00 .07 -.03 -.08 .18 -.24 .05 -.04 -.13 .27|-.47 .20 -.21 .02 -.01 -.03 -.15 .45\*-.09 .18

[B] Entire series, effect on correlation ( .557) is:

Lower 1935> -.090 1927< -.069 1986> -.010 1962> -.010 1981> -.007 1925> -.006 Higher 2003 .022 1940 .017

1924 to 1953 segment:

Lower 1935> -.190 1927< -.128 1925> -.013 1950> -.012 1931< -.011 1952< -.008 Higher 1940 .070 1924 .040

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

1927 -5.6 SD; 1935 +3.7 SD

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397A 1913 to 2010 98 years Series 11

[B] Entire series, effect on correlation ( .605) is:

Lower 1920< -.035 2003> -.027 1917> -.026 1987< -.014 1962> -.014 2005> -.011 Higher 1935 .047 1996 .011

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

1920 -6.8 SD

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397B 1918 to 2010 93 years Series 12

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

Lower 1940> -.025 1920< -.012 1919< -.011 1995< -.011 2000> -.010 2004> -.010 Higher 1935 .067 2003 .014

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

1920 -4.7 SD

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399A 1940 to 2010 71 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

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

1940 1969 0 -.18 .04 -.26 -.19 .04 -.11 .04 .10 -.15 -.05 .40\*-.11 .15 .24 .11 -.14 .33 -.20 -.17 -.24 -.01

[B] Entire series, effect on correlation ( .609) is:

Lower 1943> -.043 1944< -.022 1945> -.019 1982< -.014 1968> -.013 1964> -.011 Higher 2003 .067 1981 .016

1940 to 1969 segment:

Lower 1943> -.094 1944< -.050 1945> -.038 1968> -.026 1964> -.020 1961< -.017 Higher 1958 .075 1940 .044

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

1943 +3.4 SD; 1958 +3.2 SD

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

399B 1946 to 2010 65 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

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

1946 1975 4 .06 -.11 -.05 -.22 .05 -.10 -.37 -.03 .22 -.45 .17| .23 .08 .05 .34\* .14 .11 -.05 -.10 .13 -.12

1950 1979 1 .09 .01 -.06 -.24 .15 -.26 -.31 .04 .05 -.46 .22| .34\* .10 -.07 .29 .17 -.03 -.06 -.19 .11 .01

[B] Entire series, effect on correlation ( .456) is:

Lower 1955< -.031 1946> -.026 1958< -.026 1984< -.025 1964> -.022 1960> -.012 Higher 2003 .110 1971 .015

1946 to 1975 segment:

Lower 1955< -.071 1958< -.059 1946> -.056 1964> -.041 1960> -.024 1952< -.018 Higher 1962 .103 1971 .061

1950 to 1979 segment:

Lower 1955< -.076 1958< -.062 1964> -.050 1960> -.027 1952< -.018 1967> -.016 Higher 1962 .080 1971 .064

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

1946 +3.6 SD; 1964 +3.2 SD

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

400A 1926 to 2010 85 years Series 15

[B] Entire series, effect on correlation ( .728) is:

Lower 1981< -.026 1951< -.026 1991< -.010 1986> -.009 1960> -.007 1948> -.007 Higher 1935 .039 2003 .025

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400B 1912 to 2010 99 years Series 16

[B] Entire series, effect on correlation ( .630) is:

Lower 1920> -.015 1989> -.014 1915< -.013 1925> -.011 1962> -.010 1913< -.009 Higher 1935 .034 1940 .019

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401A 1906 to 2010 105 years Series 17

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

Lower 1914< -.072 1913> -.009 1907> -.009 1943> -.008 1981> -.007 1928< -.006 Higher 1935 .048 2003 .017

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

1913 +3.1 SD

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401B 1861 to 2010 150 years Series 18

[\*] Early part of series cannot be checked from 1861 to 1889 -- not matched by another series

[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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1890 1919 0 .09 -.16 .11 -.29 .31 .10 .02 -.38 -.15 -.01 .40\*-.16 .20 -.13 .32 -.35 .02 -.18 .35 -.03 -.08

[B] Entire series, effect on correlation ( .551) is:

Lower 2003> -.021 1896> -.021 1984> -.014 1894> -.013 1902< -.013 1939< -.012 Higher 1935 .041 1901 .013

1890 to 1919 segment:

Lower 1896> -.085 1894> -.052 1902< -.047 1892< -.040 1918< -.026 1903> -.026 Higher 1901 .081 1893 .048

[D] 15 Absent rings: Year Master N series Absent

1996 -1.445 20 1

1997 -.014 20 1 >> WARNING: Ring is not usually narrow

1998 .307 20 1 >> WARNING: Ring is not usually narrow

1999 1.145 20 1 >> WARNING: Ring is not usually narrow

2000 -.050 20 1 >> WARNING: Ring is not usually narrow

2001 1.545 20 1 >> WARNING: Ring is not usually narrow

2002 1.240 20 1 >> WARNING: Ring is not usually narrow

2003 -1.566 20 1

2004 -1.818 20 1

2005 -1.619 20 1

2006 -1.041 20 1

2007 .447 20 1 >> WARNING: Ring is not usually narrow

2008 -.054 20 1 >> WARNING: Ring is not usually narrow

2009 -.147 20 1 >> WARNING: Ring is not usually narrow

2010 1.471 20 1 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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

1896 +4.4 SD

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528A 1905 to 2010 106 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

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1905 1934 10 -.09 .13 .23 -.07 -.01 .04 -.05 -.19 -.16 -.29 .29|-.18 .38 -.02 .00 -.21 -.07 .02 -.09 .02 .44\*

1920 1949 -8 .27 -.26 .63\*-.09 -.17 .30 -.27 .03 -.12 -.27 .56|-.26 .13 .17 -.22 .13 -.19 .02 .03 -.14 .25

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

Lower 1943< -.044 1909> -.022 1911> -.016 1945< -.009 1987< -.009 1935> -.008 Higher 2003 .031 1940 .013

1905 to 1934 segment:

Lower 1909> -.097 1911> -.071 1916< -.030 1915< -.029 1926< -.028 1913> -.018 Higher 1925 .074 1905 .063

1920 to 1949 segment:

Lower 1943< -.086 1935> -.040 1945< -.015 1948> -.013 1920> -.013 1926< -.012 Higher 1940 .039 1941 .017

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

1909 +3.1 SD; 1911 +3.4 SD; 1985 -5.3 SD

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528B 1909 to 2010 102 years Series 20

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

Lower 1911> -.025 1920> -.018 1977> -.014 1987< -.012 1929< -.011 1926< -.011 Higher 1935 .060 2003 .030

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

1964 -1.552 20 4

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

1911 +3.8 SD; 1920 +3.1 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 392A 1924 2010 87 6 4 .488 1.09 3.14 .643 .821 .278 2.55 .426 -.049 1

2 392B 1925 2010 86 6 4 .465 .82 1.94 .533 .886 .306 2.67 .470 .067 1

3 393A 1890 2010 121 8 0 .643 .80 2.59 .627 .911 .266 2.59 .402 -.052 1

4 393B 1910 2010 101 7 0 .682 1.31 4.81 1.123 .883 .281 2.87 .426 -.029 1

5 394A 1919 2010 92 7 1 .614 2.23 6.25 1.047 .763 .245 2.80 .558 -.073 1

6 394B 1909 2010 102 7 1 .549 2.39 5.08 1.052 .779 .230 2.70 .543 -.044 2

7 395A 1905 2010 106 7 2 .608 1.16 3.16 .746 .872 .297 2.64 .369 -.007 1

8 395B 1926 2010 85 6 0 .758 1.27 5.66 .924 .833 .286 2.78 .613 -.006 1

9 396A 1921 2010 90 6 2 .518 1.76 4.24 .821 .753 .286 2.46 .409 -.078 1

10 396B 1924 2010 87 6 1 .557 1.35 3.77 .667 .679 .299 2.63 .461 .020 2

11 397A 1913 2010 98 7 0 .605 1.10 2.63 .763 .895 .307 2.71 .432 -.041 1

12 397B 1918 2010 93 7 0 .704 1.44 3.38 .902 .866 .302 2.52 .429 -.012 1

13 399A 1940 2010 71 5 1 .609 1.77 4.07 .753 .734 .216 3.05 .535 .037 1

14 399B 1946 2010 65 5 2 .456 2.60 5.86 1.270 .888 .183 2.63 .527 .043 2

15 400A 1926 2010 85 6 0 .728 2.38 4.88 .888 .701 .211 2.56 .452 -.025 1

16 400B 1912 2010 99 7 0 .630 1.38 3.94 .999 .901 .269 2.56 .493 -.044 1

17 401A 1906 2010 105 7 0 .689 1.96 4.65 .835 .733 .250 2.65 .506 -.064 1

18 401B 1861 2010 150 8 1 .551 1.00 2.92 .715 .895 .241 2.58 .413 .003 1

19 528A 1905 2010 106 7 2 .651 1.71 3.65 .810 .692 .308 2.58 .410 -.044 1

20 528B 1909 2010 102 7 0 .682 1.19 3.50 .802 .872 .367 2.68 .463 -.028 1

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Total or mean: 1931 132 21 .613 1.49 6.25 .837 .822 .273 3.05 .462 -.024

- = [ COFECHA 92 COF ] = -