[] Dendrochronology Program Library Run 3 Program COF 15:28 Fri 12 Jul 2013 Page 1

[]

[] P R O G R A M C O F E C H A Version 6.06P 28684

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Run3

File of DATED series: BLTLow\_PCRU\_COMPLETEdataset\_3

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 1894 to 2012 119 years

Continuous time span is 1894 to 2012 119 years

Portion with two or more series is 1900 to 2012 113 years

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

\*C\* Number of dated series 15 \*C\*

\*O\* Master series 1894 2012 119 yrs \*O\*

\*F\* Total rings in all series 1406 \*F\*

\*E\* Total dated rings checked 1400 \*E\*

\*C\* Series intercorrelation .514 \*C\*

\*H\* Average mean sensitivity .230 \*H\*

\*A\* Segments, possible problems 24 \*A\*

\*\*\* Mean length of series 93.7 \*\*\*

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

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

325A 2 absent rings: 1930 1935

325B 2 absent rings: 1930 1935

482A 1 absent rings: 1981

5 absent rings .356%

PART 2: TIME PLOT OF TREE-RING SERIES: Run3 15:28 Fri 12 Jul 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

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

. . . . . . . . . . . . . . . . . <==========> . 322A 1 1904 2012 109

. . . . . . . . . . . . . . . . . <==========> . 322B 2 1905 2012 108

. . . . . . . . . . . . . . . . . <==========> . 323A 3 1903 2012 110

. . . . . . . . . . . . . . . . . . <=====> . 324A 4 1952 2012 61

. . . . . . . . . . . . . . . . . . <=====> . 324B 5 1950 2012 63

. . . . . . . . . . . . . . . . . <==========> . 325A 6 1900 2012 113

. . . . . . . . . . . . . . . . . <==========> . 325B 7 1902 2012 111

. . . . . . . . . . . . . . . . . . <=======> . 326A 8 1938 2012 75

. . . . . . . . . . . . . . . . . . <======> . 326B 9 1944 2012 69

. . . . . . . . . . . . . . . . . . <=======> . 329B 10 1932 2012 81

. . . . . . . . . . . . . . . . . <==========> . 330B 11 1901 2012 112

. . . . . . . . . . . . . . . . . <===========> . 482A 12 1894 2012 119

. . . . . . . . . . . . . . . . . <==========> . 483B 13 1908 2012 105

. . . . . . . . . . . . . . . . . . <======> . 483A 14 1945 2012 68

. . . . . . . . . . . . . . . . . .<=========> . 482B 15 1911 2012 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: Run3 15:28 Fri 12 Jul 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 -.502 2 1950 -.568 14 2000 .615 15

1901 -.472 3 1951 .458 14 2001 .739 15

1902 1.144 4 1952 .813 15 2002 1.508 15

1903 .829 5 1953 1.183 15 2003 .481 15

1904 1.338 6 1954 .496 15 2004 -.241 15

1905 1.406 7 1955 .493 15 2005 -.817 15

1906 .156 7 1956 -.968 15 2006 -2.192 15

1907 -.719 7 1957 1.230 15 2007 -.905 15

1908 -.343 8 1958 .913 15 2008 -1.220 15

1909 -.664 8 1959 .174 15 2009 .122 15

1910 .496 8 1960 -.408 15 2010 .504 15

1911 -2.380 9 1961 .777 15 2011 -.031 15

1912 -.009 9 1962 -1.991 15 2012 1.444 15

1913 1.186 9 1963 -1.259 15

1914 -.461 9 1964 -.152 15

1915 1.285 9 1965 -.464 15

1916 1.190 9 1966 .222 15

1917 .689 9 1967 -.243 15

1918 .855 9 1968 .181 15

1919 .501 9 1969 .555 15

1920 .560 9 1970 1.153 15

1921 1.097 9 1971 1.716 15

1922 .477 9 1972 1.022 15

1923 -.614 9 1973 .887 15

1924 -.478 9 1974 -.562 15

1925 -.203 9 1975 -.396 15

1926 -1.143 9 1976 -.522 15

1927 -.430 9 1977 -.818 15

1928 -.491 9 1978 -.949 15

1929 -1.114 9 1979 -1.177 15

1930 -2.444 9 2 1980 -.436 15

1931 -1.639 9 1981 -1.765 15 1

1932 -.567 10 1982 -1.172 15

1933 -.597 10 1983 -1.335 15

1934 -1.462 10 1984 -1.378 15

1935 -1.519 10 2 1985 -.340 15

1936 -1.439 10 1986 .294 15

1937 -1.137 10 1987 1.008 15

1938 .815 11 1988 1.157 15

1939 .573 11 1989 .733 15

1940 1.440 11 1990 .638 15

1941 1.115 11 1991 1.147 15

1942 .943 11 1992 1.541 15

1943 .604 11 1993 1.194 15

1894 .849 1 1944 .825 12 1994 .296 15

1895 -1.213 1 1945 .759 13 1995 .069 15

1896 -2.417 1 1946 -.690 13 1996 -1.003 15

1897 -1.176 1 1947 .394 13 1997 -.821 15

1898 .494 1 1948 -.625 13 1998 .315 15

1899 1.788 1 1949 .544 13 1999 .652 15

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PART 4: Master Bar Plot: Run3 15:28 Fri 12 Jul 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---b 1950---b 2000-------B

1901---b 1951------B 2001-------C

1902---------E 1952--------C 2002----------F

1903--------C 1953---------E 2003------B

1904----------E 1954------B 2004----a

1905----------F 1955------B 2005--c

1906-----A 1956--d 2006i

1907--c 1957---------E 2007--d

1908----a 1958--------D 2008-e

1909--c 1959-----A 2009-----@

1910------B 1960----b 2010------B

1911j 1961--------C 2011-----@

1912-----@ 1962h 2012----------F

1913---------E 1963-e

1914---b 1964----a

1915---------E 1965---b

1916---------E 1966-----A

1917-------C 1967----a

1918--------C 1968-----A

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

1920------B 1970---------E

1921---------D 1971----------G

1922------B 1972---------D

1923---b 1973--------D

1924---b 1974---b

1925----a 1975----b

1926-e 1976---b

1927---b 1977--c

1928---b 1978--d

1929-d 1979-e

1930j 1980---b

1931g 1981g

1932---b 1982-e

1933---b 1983-e

1934-f 1984-f

1935f 1985----a

1936-f 1986-----A

1937-e 1987---------D

1938--------C 1988---------E

1939-------B 1989-------C

1940----------F 1990-------C

1941---------D 1991---------E

1942--------D 1992----------F

1943-------B 1993---------E

1894--------C 1944--------C 1994-----A

1895-e 1945--------C 1995-----@

1896j 1946--c 1996-d

1897-e 1947------B 1997--c

1898------B 1948---b 1998-----A

1899----------G 1949------B 1999-------C

PART 5: CORRELATION OF SERIES BY SEGMENTS: Run3 15:28 Fri 12 Jul 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 1890 1905 1920 1935 1950 1965 1980 1995

1919 1934 1949 1964 1979 1994 2009 2024

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

1 322A 1904 2012 .68 .67 .57 .69 .68 .66 .47 .29A

2 322B 1905 2012 .61 .43 .56 .66 .54 .60 .59

3 323A 1903 2012 .29B .31B .35B .53 .43 .46B .46 .48

4 324A 1952 2012 .55 .34B .55 .46

5 324B 1950 2012 .70 .39B .43B .46

6 325A 1900 2012 .60 .73 .23B .17B .17B .37A .52 .53

7 325B 1902 2012 .70 .69 .46B .57 .58 .43B .48 .59

8 326A 1938 2012 .36A .54 .63 .69 .61

9 326B 1944 2012 .42A .54 .43B .48 .46

10 329B 1932 2012 .23B .26B .37B .44 .49 .59

11 330B 1901 2012 .53 .66 .53 .56 .61 .55 .50 .44

12 482A 1894 2012 .50 .54 .58 .60 .56 .47 .51 .52

13 483B 1908 2012 .74 .63 .74 .65 .20B-.05B-.09B

14 483A 1945 2012 .63 .70 .35B .63 .70

15 482B 1911 2012 .55 .62 .60 .59 .61 .58 .57

Av segment correlation .55 .61 .46 .51 .56 .46 .49 .48

PART 6: POTENTIAL PROBLEMS: Run3 15:28 Fri 12 Jul 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

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

322A 1904 to 2012 109 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

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

1983 2012 0 -.15 -.08 -.35 -.16 -.11 -.21 -.04 -.32 .26 .14 .29\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .552) is:

Lower 2004> -.014 2012< -.014 1953< -.013 2006> -.013 2010< -.013 1923> -.012 Higher 1962 .057 1911 .020

1983 to 2012 segment:

Lower 2004> -.062 2006> -.050 2012< -.044 1998< -.039 2010< -.039 2011> -.028 Higher 1996 .133 2005 .041

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

322B 1905 to 2012 108 years Series 2

[B] Entire series, effect on correlation ( .565) is:

Lower 1935< -.033 2001< -.012 1942< -.011 2011> -.011 2004> -.010 1923< -.010 Higher 1911 .032 1930 .017

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

1915 +3.2 SD

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

323A 1903 to 2012 110 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

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

1903 1932 -1 - -.25 -.19 -.08 -.04 .10 .14 .11 .21 .42\* .29|-.05 .18 .24 -.10 -.14 -.03 -.19 -.40 -.05 -.19

1905 1934 -1 -.14 -.24 .04 .01 -.08 .02 .23 .21 .14 .38\* .31|-.14 .13 .29 -.14 -.17 -.13 -.21 -.32 -.23 -.35

1920 1949 -7 .00 -.11 -.11 .43\* .10 .15 .24 .10 .36 .17 .35|-.22 .29 -.19 .02 -.20 .01 -.18 -.09 -.02 -.05

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

1965 1994 -3 -.08 -.09 -.43 -.22 -.06 .05 -.29 .56\* .15 .15 .46| .12 .38 .02 -.01 -.13 -.15 .06 -.32 .19 -.09

[B] Entire series, effect on correlation ( .405) is:

Lower 1965< -.053 1963> -.028 1937< -.010 1912< -.010 2009< -.009 1932< -.009 Higher 2012 .014 1962 .012

1903 to 1932 segment:

Lower 1932< -.055 1912< -.049 1903> -.036 1924< -.026 1917> -.023 1908< -.018 Higher 1911 .111 1904 .034

1905 to 1934 segment:

Lower 1932< -.057 1912< -.047 1924< -.029 1917> -.027 1908< -.019 1929> -.018 Higher 1911 .090 1916 .026

1920 to 1949 segment:

Lower 1937< -.056 1932< -.045 1935> -.032 1930> -.031 1929> -.024 1941< -.022 Higher 1946 .051 1938 .044

1965 to 1994 segment:

Lower 1965< -.190 1983> -.032 1990< -.010 1967> -.010 1984> -.008 1976> -.006 Higher 1992 .027 1971 .026

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

1963 +4.2 SD; 1964 +3.0 SD

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324A 1952 to 2012 61 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 .01 -.24 -.18 -.18 -.13 .02 -.22 .06 -.10 .08 .34| .40 .53\* .16 .26 -.09 .06 -.21 -.18 -.22 -.32

[B] Entire series, effect on correlation ( .522) is:

Lower 1974> -.030 1973< -.025 1993< -.025 1954> -.021 1996> -.017 1955< -.016 Higher 1962 .121 1981 .026

1965 to 1994 segment:

Lower 1974> -.088 1993< -.062 1973< -.061 1992< -.039 1967> -.029 1988< -.024 Higher 1981 .137 1971 .067

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

324B 1950 to 2012 63 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

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

1965 1994 1 -.09 .05 -.49 -.22 -.17 -.07 .04 .11 .16 -.15 .39| .60\* .49 .42 .10 -.16 -.18 -.09 -.26 -.29 -.23

1980 2009 1 .01 .11 .07 .15 -.18 -.17 -.11 -.08 -.11 .02 .43| .55\* .45 .21 - - - - - - -

[B] Entire series, effect on correlation ( .596) is:

Lower 2004< -.056 1954> -.039 1993< -.029 1972< -.014 1988< -.010 1980< -.010 Higher 1962 .125 1981 .014

1965 to 1994 segment:

Lower 1993< -.102 1972< -.045 1980< -.034 1988< -.033 1975> -.025 1967> -.022 Higher 1981 .103 1991 .040

1980 to 2009 segment:

Lower 2004< -.101 1993< -.065 1988< -.023 1980< -.021 1997> -.019 1984> -.013 Higher 1981 .051 1996 .032

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

325A 1900 to 2012 113 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 -1 -.38 -.33 -.17 -.23 -.04 .04 .13 .12 .18 .43\* .23| .28 .14 .18 .15 .25 .08 .24 .04 .08 -.25

1935 1964 9 -.15 -.24 -.11 -.20 .09 -.12 .22 -.17 .03 -.14 .17|-.18 -.23 -.06 -.21 -.15 .15 .13 .16 .28\* .04

1950 1979 8 -.04 .08 .06 -.04 .04 -.03 .18 -.25 -.02 -.36 .17|-.13 -.26 -.12 -.25 -.15 .06 .27 .34\* .24 .25

1965 1994 0 -.03 .01 -.10 .09 -.10 .14 .15 .02 .12 -.06 .37\* .09 .05 -.08 -.46 -.22 -.22 .16 .08 .20 .24

[B] Entire series, effect on correlation ( .450) is:

Lower 1979> -.028 1962> -.026 2000< -.024 1946> -.015 1900> -.012 1963> -.012 Higher 1911 .078 2006 .017

1920 to 1949 segment:

Lower 1946> -.088 1947< -.057 1936> -.043 1933> -.033 1940< -.033 1949< -.022 Higher 1930 .099 1938 .049

1935 to 1964 segment:

Lower 1946> -.045 1947< -.045 1963> -.043 1936> -.025 1940< -.025 1949< -.019 Higher 1935 .061 1957 .049

1950 to 1979 segment:

Lower 1979> -.107 1963> -.042 1966< -.027 1978> -.021 1951< -.013 1959> -.011 Higher 1974 .073 1957 .062

1965 to 1994 segment:

Lower 1979> -.204 1978> -.049 1987< -.033 1966< -.026 1986< -.014 1971< -.012 Higher 1981 .113 1974 .084

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

1930 -2.444 9 2

1935 -1.519 10 2

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

1963 +3.3 SD; 1979 +4.4 SD; 1980 +3.2 SD

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325B 1902 to 2012 111 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 4 -.10 -.07 -.37 -.15 -.35 -.16 -.16 -.12 -.32 -.12 .46| .14 .27 .10 .50\* .18 .17 .10 .15 .15 -.04

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

1965 1994 -1 -.10 -.32 -.33 -.29 -.12 .19 .28 .40 .15 .43\* .43| .24 .25 -.01 -.29 -.32 -.09 .07 -.12 -.08 .02

[B] Entire series, effect on correlation ( .565) is:

Lower 1935< -.038 1936> -.015 1981> -.013 1966< -.012 1909< -.009 1948> -.008 Higher 1930 .031 1911 .013

1920 to 1949 segment:

Lower 1935< -.073 1936> -.053 1948> -.037 1934> -.019 1921< -.013 1940< -.010 Higher 1930 .107 1938 .034

1965 to 1994 segment:

Lower 1981> -.080 1966< -.071 1974> -.044 1986< -.035 1983> -.024 1987< -.013 Higher 1992 .041 1971 .039

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

1935 1936 4.3 SD

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

1930 -2.444 9 2

1935 -1.519 10 2

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326A 1938 to 2012 75 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

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

1938 1967 0 -.07 .17 -.03 -.12 -.15 -.12 .14 .03 .06 .02 .36\*-.15 .13 -.11 .22 -.25 -.22 -.22 .22 -.26 .23

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

Lower 1938< -.076 1946< -.025 1962> -.022 2011< -.013 1950> -.012 1976> -.009 Higher 1957 .019 2006 .018

1938 to 1967 segment:

Lower 1938< -.122 1962> -.045 1950> -.025 1964< -.011 1956> -.008 1952< -.005 Higher 1957 .045 1940 .026

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

1946 -6.2 SD

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326B 1944 to 2012 69 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

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

1944 1973 0 -.12 .18 -.05 -.16 -.11 -.12 -.05 -.22 -.02 -.15 .42\*-.08 .23 -.01 -.06 -.06 .11 -.05 .21 -.32 -.17

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

1965 1994 3 -.27 -.10 -.34 -.08 -.30 .10 -.08 .04 .39 .23 .43| .36 .45 .48\* .21 .25 -.08 -.15 -.24 -.20 -.31

[B] Entire series, effect on correlation ( .463) is:

Lower 1945< -.038 1999< -.029 1994> -.023 1962> -.022 1946> -.017 1971< -.013 Higher 1981 .025 1957 .022

1944 to 1973 segment:

Lower 1945< -.062 1962> -.046 1946> -.031 1971< -.022 1954< -.012 1965> -.012 Higher 1957 .042 1956 .027

1965 to 1994 segment:

Lower 1994> -.081 1971< -.064 1991< -.038 1980< -.020 1972< -.019 1965> -.017 Higher 1981 .135 1979 .036

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329B 1932 to 2012 81 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

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

1932 1961 4 .23 -.28 .15 -.33 -.08 -.16 .09 -.04 .09 -.20 .23| .20 -.05 .00 .41\*-.08 .20 .07 -.22 .18 -.24

1935 1964 4 .18 -.31 .08 -.30 .04 -.28 -.15 -.06 .09 -.29 .26| .16 -.12 -.01 .47\*-.03 .28 .13 -.21 .16 -.23

1950 1979 4 .04 -.30 .15 -.23 -.02 -.18 -.13 -.02 .28 -.31 .37| .14 -.10 -.10 .42\* .03 .37 .12 -.18 -.06 -.34

[B] Entire series, effect on correlation ( .409) is:

Lower 1958< -.055 1960> -.025 1948> -.020 1947< -.019 1981> -.018 1937> -.017 Higher 1956 .023 1996 .021

1932 to 1961 segment:

Lower 1958< -.128 1960> -.075 1948> -.060 1937> -.049 1947< -.042 1961< -.016 Higher 1956 .109 1934 .053

1935 to 1964 segment:

Lower 1958< -.132 1960> -.052 1947< -.041 1948> -.040 1937> -.033 1963> -.019 Higher 1962 .107 1956 .069

1950 to 1979 segment:

Lower 1958< -.156 1960> -.060 1963> -.023 1961< -.017 1965> -.015 1979> -.013 Higher 1956 .052 1962 .052

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

1958 -4.6 SD

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330B 1901 to 2012 112 years Series 11

[B] Entire series, effect on correlation ( .501) is:

Lower 1903< -.039 2011< -.020 1946> -.015 1915< -.014 1989< -.013 1939< -.011 Higher 1911 .041 1962 .028

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482A 1894 to 2012 119 years Series 12

[\*] Early part of series cannot be checked from 1894 to 1899 -- not matched by another series

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

Lower 1917< -.071 1933< -.014 1960> -.011 1922> -.010 1935> -.009 1903< -.009 Higher 1911 .054 1930 .025

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

1981 -1.765 15 1

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

1917 -5.1 SD

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

483B 1908 to 2012 105 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

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

1965 1994 -2 -.23 -.30 -.04 .14 -.09 .08 .10 -.07 .52\* .39 .20| .00 .08 .19 .06 .22 -.29 -.26 -.16 -.26 -.04

1980 2009 -8 -.07 .06 .41\* .22 .02 .09 -.12 .07 -.05 .18 -.05| .12 .28 .20 - - - - - - -

1983 2012 -8 -.01 .13 .31\* .18 -.05 .01 -.11 .03 -.01 .14 -.09| - - - - - - - - - -

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

Lower 1996> -.038 2002< -.031 1956> -.027 1991< -.018 1977> -.016 1986< -.010 Higher 1962 .090 1911 .032

1965 to 1994 segment:

Lower 1991< -.074 1977> -.073 1994> -.041 1965> -.039 1986< -.038 1970< -.036 Higher 1974 .104 1979 .061

1980 to 2009 segment:

Lower 1996> -.125 2002< -.096 1991< -.055 1986< -.029 1994> -.027 2008> -.017 Higher 2004 .062 1987 .038

1983 to 2012 segment:

Lower 1996> -.121 2002< -.087 1991< -.049 1994> -.028 2011> -.027 1986< -.024 Higher 2004 .078 1997 .052

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

1996 +3.6 SD

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483A 1945 to 2012 68 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

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

1965 1994 -1 -.27 -.29 -.02 -.01 .05 -.06 .05 .09 .23 .58\* .35| .21 .20 .13 .35 .18 .09 -.21 -.34 -.48 -.33

[B] Entire series, effect on correlation ( .648) is:

Lower 1947< -.039 1956> -.019 1965> -.016 1974> -.016 1970< -.016 2004> -.016 Higher 1962 .115 1957 .017

1965 to 1994 segment:

Lower 1970< -.062 1965> -.059 1967> -.049 1969< -.035 1974> -.025 1994> -.022 Higher 1987 .048 1979 .048

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482B 1911 to 2012 102 years Series 15

[B] Entire series, effect on correlation ( .563) is:

Lower 1956> -.033 1953< -.022 1911> -.017 1996> -.011 1917> -.011 1918< -.010 Higher 1962 .081 2006 .015

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PART 7: DESCRIPTIVE STATISTICS: Run3 15:28 Fri 12 Jul 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 322A 1904 2012 109 8 1 .552 1.09 1.94 .319 .701 .190 2.66 .497 -.055 1

2 322B 1905 2012 108 7 0 .565 1.31 2.85 .395 .656 .193 3.00 .483 .040 1

3 323A 1903 2012 110 8 4 .405 .88 4.20 .691 .933 .231 2.66 .375 -.066 3

4 324A 1952 2012 61 4 1 .522 1.92 4.21 .916 .791 .243 2.75 .507 .097 1

5 324B 1950 2012 63 4 2 .596 1.56 3.99 .807 .801 .238 2.71 .486 -.007 1

6 325A 1900 2012 113 8 4 .450 1.49 4.75 .997 .898 .293 2.58 .367 -.087 1

7 325B 1902 2012 111 8 2 .565 1.03 4.17 .835 .925 .285 2.51 .352 -.006 3

8 326A 1938 2012 75 5 1 .462 1.16 2.32 .533 .780 .250 2.56 .386 -.046 4

9 326B 1944 2012 69 5 2 .463 1.56 3.39 .820 .847 .244 2.80 .563 .001 3

10 329B 1932 2012 81 6 3 .409 1.63 3.19 .513 .671 .201 2.58 .519 .014 1

11 330B 1901 2012 112 8 0 .501 1.14 2.30 .348 .726 .186 2.52 .424 -.065 1

12 482A 1894 2012 119 8 0 .551 .77 1.98 .394 .858 .241 2.68 .440 -.032 1

13 483B 1908 2012 105 7 3 .488 1.04 3.39 .639 .816 .220 2.64 .409 .008 4

14 483A 1945 2012 68 5 1 .648 1.15 2.24 .573 .908 .168 2.65 .420 .079 1

15 482B 1911 2012 102 7 0 .563 1.51 4.21 1.045 .922 .255 2.74 .347 -.052 1

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Total or mean: 1406 98 24 .514 1.24 4.75 .642 .817 .230 3.00 .431 -.019

- = [ COFECHA 3 COF ] = -