[] Dendrochronology Program Library Run FINAL Program COF 13:47 Wed 05 Mar 2014 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 28920

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Final

File of DATED series: SNCMid\_ACSH\_5

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

3 Autoregressive model applied A Residuals are used in master dating series and testing

4 Series transformed to logarithms Y Each series log-transformed for master dating series and testing

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .3281

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1872 to 2012 141 years

Continuous time span is 1872 to 2012 141 years

Portion with two or more series is 1894 to 2012 119 years

>> 551A 2012 absent in 3 of 19 series, but is not usually narrow: master index is .810

>> 555A 1964 absent in 1 of 19 series, but is not usually narrow: master index is -.190

>> 555A 1966 absent in 1 of 19 series, but is not usually narrow: master index is .413

>> 555A 1967 absent in 1 of 19 series, but is not usually narrow: master index is .659

>> 555B 1971 absent in 1 of 19 series, but is not usually narrow: master index is -.291

>> 555B 2000 absent in 1 of 19 series, but is not usually narrow: master index is -.275

>> 555B 2001 absent in 1 of 19 series, but is not usually narrow: master index is -.302

>> 558A 2009 absent in 3 of 19 series, but is not usually narrow: master index is .198

>> 558A 2010 absent in 2 of 19 series, but is not usually narrow: master index is -.270

>> 558A 2011 absent in 2 of 19 series, but is not usually narrow: master index is -.213

>> 558A 2012 absent in 3 of 19 series, but is not usually narrow: master index is .810

>> 557A 2007 absent in 1 of 19 series, but is not usually narrow: master index is -.140

>> 557A 2008 absent in 2 of 19 series, but is not usually narrow: master index is .447

>> 557A 2009 absent in 3 of 19 series, but is not usually narrow: master index is .198

>> 557A 2010 absent in 2 of 19 series, but is not usually narrow: master index is -.270

>> 557A 2011 absent in 2 of 19 series, but is not usually narrow: master index is -.213

>> 557A 2012 absent in 3 of 19 series, but is not usually narrow: master index is .810

>> 557B 2008 absent in 2 of 19 series, but is not usually narrow: master index is .447

>> 557B 2009 absent in 3 of 19 series, but is not usually narrow: master index is .198

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

\*C\* Number of dated series 19 \*C\*

\*O\* Master series 1872 2012 141 yrs \*O\*

\*F\* Total rings in all series 1741 \*F\*

\*E\* Total dated rings checked 1719 \*E\*

\*C\* Series intercorrelation .493 \*C\*

\*H\* Average mean sensitivity .318 \*H\*

\*A\* Segments, possible problems 14 \*A\*

\*\*\* Mean length of series 91.6 \*\*\*

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

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

538B 1 absent rings: 1970

551A 1 absent rings: 2012

551B 1 absent rings: 1989

555A 6 absent rings: 1964 1965 1966 1967 1986 1988

555B 3 absent rings: 1971 2000 2001

558A 4 absent rings: 2009 2010 2011 2012

557A 6 absent rings: 2007 2008 2009 2010 2011 2012

557B 2 absent rings: 2008 2009

24 absent rings 1.379%

PART 2: TIME PLOT OF TREE-RING SERIES: Final 13:47 Wed 05 Mar 2014 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

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

. . . . . . . . . . . . . . . . . <=============> . 537A 1 1872 2012 141

. . . . . . . . . . . . . . . . . <===========> . 537B 2 1897 2012 116

. . . . . . . . . . . . . . . . . <===========> . 538B 3 1894 2012 119

. . . . . . . . . . . . . . . . . . <========> . 543B 4 1924 2012 89

. . . . . . . . . . . . . . . . . . <=======> . 549A 5 1931 2012 82

. . . . . . . . . . . . . . . . . . <=====> . 549B 6 1950 2012 63

. . . . . . . . . . . . . . . . . . <========> . 551A 7 1923 2012 90

. . . . . . . . . . . . . . . . . . <========> . 551B 8 1926 2012 87

. . . . . . . . . . . . . . . . . . <======> . 552B 9 1944 2012 69

. . . . . . . . . . . . . . . . . . <=====> . 554B 10 1950 2012 63

. . . . . . . . . . . . . . . . . . <========> . 555A 11 1924 2012 89

. . . . . . . . . . . . . . . . . .<=========> . 555B 12 1913 2012 100

. . . . . . . . . . . . . . . . . <==========> . 558A 13 1907 2012 106

. . . . . . . . . . . . . . . . . . <======> . 558B 14 1940 2012 73

. . . . . . . . . . . . . . . . . . <========> . 557A 15 1923 2012 90

. . . . . . . . . . . . . . . . . . <=======> . 557B 16 1938 2012 75

. . . . . . . . . . . . . . . . . <===========> . 559A 17 1898 2012 115

. . . . . . . . . . . . . . . . . .<=========> . 559B 18 1910 2012 103

. . . . . . . . . . . . . . . . . . <======> . 560A 19 1942 2012 71

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

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: Final 13:47 Wed 05 Mar 2014 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 1.342 4 1950 -.456 19 2000 -.275 19 1<<

1901 .776 4 1951 .856 19 2001 -.302 19 1<<

1902 .901 4 1952 .905 19 2002 .583 19

1903 .730 4 1953 .088 19 2003 .599 19

1904 -.324 4 1954 -1.691 19 2004 .659 19

1905 -2.900 4 1955 .840 19 2005 1.307 19

1906 -1.838 4 1956 -.878 19 2006 .429 19

1907 .597 5 1957 -.260 19 2007 -.140 19 1<<

1908 -.488 5 1958 .324 19 2008 .447 19 2<<

1909 .310 5 1959 -.386 19 2009 .198 19 3<<

1910 .126 6 1960 .315 19 2010 -.270 19 2<<

1911 -.540 6 1961 .862 19 2011 -.213 19 2<<

1912 -.690 6 1962 -.346 19 2012 .810 19 3<<

1913 -1.056 7 1963 -.376 19

1914 -1.124 7 1964 -.190 19 1<<

1915 -1.964 7 1965 -.592 19 1

1916 -1.461 7 1966 .413 19 1<<

1917 .558 7 1967 .659 19 1<<

1918 .319 7 1968 -.157 19

1919 .515 7 1969 .632 19

1920 1.604 7 1970 -2.159 19 1

1921 1.948 7 1971 -.291 19 1<<

1872 -.264 1 1922 1.345 7 1972 -.030 19

1873 1.916 1 1923 .625 9 1973 .433 19

1874 1.283 1 1924 .985 11 1974 .128 19

1875 -.475 1 1925 .516 11 1975 .836 19

1876 .704 1 1926 .139 12 1976 .922 19

1877 -1.171 1 1927 -.133 12 1977 -.652 19

1878 .863 1 1928 -.026 12 1978 .030 19

1879 2.164 1 1929 -.592 12 1979 -.276 19

1880 1.685 1 1930 -.887 12 1980 -.204 19

1881 .953 1 1931 .095 13 1981 -.161 19

1882 -2.408 1 1932 -.479 13 1982 1.217 19

1883 -.615 1 1933 -.637 13 1983 1.408 19

1884 -.555 1 1934 -.263 13 1984 1.232 19

1885 -.891 1 1935 .452 13 1985 1.099 19

1886 1.294 1 1936 -2.939 13 1986 -.625 19 1

1887 -1.241 1 1937 .425 13 1987 .881 19

1888 -2.754 1 1938 -.037 14 1988 -1.678 19 1

1889 -2.140 1 1939 .422 14 1989 -1.958 19 1

1890 -1.591 1 1940 -.505 15 1990 -.990 19

1891 -.655 1 1941 .005 15 1991 -.236 19

1892 .145 1 1942 .792 16 1992 -.190 19

1893 -.885 1 1943 1.276 16 1993 .176 19

1894 -.150 2 1944 .746 17 1994 .132 19

1895 1.399 2 1945 -.418 17 1995 -.747 19

1896 -.228 2 1946 -.715 17 1996 -.356 19

1897 .130 3 1947 1.316 17 1997 -.109 19

1898 1.391 4 1948 -1.195 17 1998 -.470 19

1899 1.805 4 1949 .593 17 1999 .286 19

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PART 4: Master Bar Plot: Final 13:47 Wed 05 Mar 2014 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---b 2000----a

1901--------C 1951--------C 2001---a

1902--------D 1952--------D 2002-------B

1903--------C 1953-----@ 2003-------B

1904---a 1954g 2004-------C

1905l 1955--------C 2005---------E

1906g 1956-d 2006------B

1907-------B 1957----a 2007----a

1908--b 1958------A 2008-------B

1909------A 1959---b 2009------A

1910-----A 1960------A 2010----a

1911--b 1961--------C 2011----a

1912--c 1962---a 2012--------C

1913-d 1963---b

1914-d 1964----a

1915h 1965--b

1916f 1966------B

1917-------B 1967-------C

1918------A 1968----a

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

1920----------F 1970i

1921----------H 1971---a

1872----a 1922---------E 1972-----@

1873----------H 1923-------C 1973------B

1874---------E 1924---------D 1974-----A

1875--b 1925-------B 1975--------C

1876--------C 1926-----A 1976--------D

1877-e 1927----a 1977--c

1878--------C 1928-----@ 1978-----@

1879----------I 1929--b 1979---a

1880----------G 1930-d 1980----a

1881---------D 1931-----@ 1981----a

1882j 1932--b 1982---------E

1883--b 1933--c 1983----------F

1884--b 1934----a 1984---------E

1885-d 1935-------B 1985---------D

1886---------E 1936l 1986--b

1887-e 1937------B 1987--------D

1888k 1938-----@ 1988g

1889i 1939------B 1989h

1890f 1940--b 1990-d

1891--c 1941-----@ 1991----a

1892-----A 1942--------C 1992----a

1893-d 1943---------E 1993------A

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

1895----------F 1945---b 1995-c

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

1897-----A 1947---------E 1997----@

1898----------F 1948-e 1998--b

1899----------G 1949-------B 1999------A

PART 5: CORRELATION OF SERIES BY SEGMENTS: Final 13:47 Wed 05 Mar 2014 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under .3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1875 1900 1925 1950 1975

1924 1949 1974 1999 2024

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

1 537A 1872 2012 .68 .71 .32A .29A .40

2 537B 1897 2012 .68 .61 .42 .52 .41

3 538B 1894 2012 .56 .51 .34B .30B .22A

4 543B 1924 2012 .60 .60 .52 .45

5 549A 1931 2012 .52 .62 .50

6 549B 1950 2012 .70 .63

7 551A 1923 2012 .51 .50 .64 .66

8 551B 1926 2012 .39 .52 .51

9 552B 1944 2012 .32A .30A .32A

10 554B 1950 2012 .30A .29A

11 555A 1924 2012 .63 .62 .15B-.03B

12 555B 1913 2012 .58 .56 .61 .53

13 558A 1907 2012 .56 .64 .60 .60

14 558B 1940 2012 .64 .59 .54

15 557A 1923 2012 .75 .75 .61 .72

16 557B 1938 2012 .70 .71 .68

17 559A 1898 2012 .62 .60 .56 .39 .31A

18 559B 1910 2012 .62 .51 .44 .37

19 560A 1942 2012 .32B .42 .35

Av segment correlation .63 .61 .51 .49 .44

PART 6: POTENTIAL PROBLEMS: Final 13:47 Wed 05 Mar 2014 Page 5

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For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 50-year segments of series filtered with 32-year spline,

at every point from ten years earlier (-10) to ten years later (+10) than dated

[B] Effect of those data values which most lower or raise correlation with master series

Symbol following year indicates value in series is greater (>) or lesser (<) than master series value

[C] Year-to-year changes very different from the mean change in other series

[D] Absent rings (zero values)

[E] Values which are statistical outliers from mean for the year

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537A 1872 to 2012 141 years Series 1

[\*] Early part of series cannot be checked from 1872 to 1893 -- 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

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

1925 1974 0 -.35 .07 -.09 -.05 .03 -.06 .04 .11 -.10 -.29 .32\*-.17 .13 .07 .12 .00 -.05 -.02 .06 -.17 -.13

1950 1999 0 -.32 .24 -.06 -.03 -.02 -.21 .03 .28 -.06 -.03 .29\* .04 .10 -.11 -.05 -.10 -.15 .10 .01 -.08 -.08

[B] Entire series, effect on correlation ( .479) is:

Lower 1952< -.063 1973< -.027 1957< -.017 1894> -.015 1998> -.011 1964> -.010 Higher 1905 .031 1936 .020

1925 to 1974 segment:

Lower 1952< -.114 1973< -.047 1957< -.027 1964> -.016 1956> -.015 1940> -.012 Higher 1936 .065 1970 .030

1950 to 1999 segment:

Lower 1952< -.116 1973< -.047 1957< -.023 1998> -.022 1956> -.018 1964> -.017 Higher 1988 .042 1970 .036

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

2008 +3.8 SD

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537B 1897 to 2012 116 years Series 2

[B] Entire series, effect on correlation ( .485) is:

Lower 2000< -.064 1948> -.020 2006> -.008 1979< -.007 1968> -.007 1954> -.007 Higher 1988 .023 1905 .013

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

1949 +3.1 SD; 2000 -6.8 SD

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538B 1894 to 2012 119 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

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

1925 1974 2 .34 -.27 .05 -.12 .07 -.15 .02 -.15 -.03 -.14 .34|-.23 .40\*-.30 .08 -.12 .11 -.28 .21 .06 .27

1950 1999 2 .05 -.04 -.09 -.09 .15 -.05 -.06 -.14 -.01 -.12 .30| .08 .41\* .16 -.10 -.21 -.06 -.26 .08 .15 .09

1963 2012 0 .06 -.03 -.02 .06 .10 -.08 -.03 -.16 -.12 -.14 .22\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .402) is:

Lower 1924< -.019 1965> -.016 1969< -.015 2004< -.013 1945> -.013 1894< -.013 Higher 1936 .067 1905 .034

1925 to 1974 segment:

Lower 1969< -.039 1965> -.031 1944< -.030 1945> -.025 1955< -.023 1931< -.014 Higher 1936 .179 1970 .034

1950 to 1999 segment:

Lower 1969< -.046 1965> -.042 1955< -.026 1976< -.017 1987< -.015 1992< -.013 Higher 1970 .048 1986 .038

1963 to 2012 segment:

Lower 1969< -.040 1965> -.037 2004< -.033 2008< -.024 2002< -.019 1976< -.016 Higher 1986 .060 1970 .057

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

1970 -2.159 19 1

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

1935 +3.2 SD; 1936 +3.9 SD; 1965 +3.0 SD

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543B 1924 to 2012 89 years Series 4

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

Lower 1973< -.024 1999< -.022 1930> -.022 2008< -.020 2011> -.012 1949< -.011 Higher 1936 .131 1970 .040

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

1930 +3.2 SD

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549A 1931 to 2012 82 years Series 5

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

Lower 1936> -.072 1940> -.012 2000> -.008 1994< -.008 2001< -.007 1978< -.007 Higher 1954 .028 1988 .022

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

1969 +3.3 SD

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549B 1950 to 2012 63 years Series 6

[B] Entire series, effect on correlation ( .658) is:

Lower 1968< -.028 2012< -.019 2000> -.016 1965> -.014 2005< -.012 1994< -.011 Higher 1970 .082 1954 .022

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551A 1923 to 2012 90 years Series 7

[B] Entire series, effect on correlation ( .447) is:

Lower 2012< -.100 1926< -.024 1930> -.022 1957< -.018 1984< -.011 1950> -.011 Higher 1970 .035 1988 .023

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

2012 .810 19 3 >> 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

1930 +3.4 SD

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551B 1926 to 2012 87 years Series 8

[B] Entire series, effect on correlation ( .421) is:

Lower 1936> -.052 1987< -.028 1935< -.027 1946> -.015 2006< -.014 1952< -.012 Higher 1970 .041 1948 .033

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

1935 1936 4.2 SD

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

1989 -1.958 19 1

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

1989 -5.7 SD

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552B 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 1993 0 .21 .20 -.05 -.24 -.07 -.24 .02 -.07 .26 .07 .32\*-.28 -.05 .02 .00 .04 -.04 .07 .09 .03 -.15

1950 1999 0 .05 .18 .09 -.10 .05 -.23 .01 -.06 .29 .01 .30\*-.23 -.06 .00 .08 -.01 .06 .03 -.09 .01 -.12

1963 2012 0 -.08 .28 .08 -.02 .03 -.15 -.04 .06 .18 .03 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .333) is:

Lower 1966< -.082 1977> -.039 1988> -.035 1962> -.017 1955< -.013 1949< -.013 Higher 1970 .036 1989 .029

1944 to 1993 segment:

Lower 1966< -.111 1977> -.047 1988> -.039 1962> -.020 1949< -.016 1955< -.016 Higher 1970 .049 1989 .035

1950 to 1999 segment:

Lower 1966< -.108 1977> -.051 1988> -.045 1962> -.022 1955< -.016 1959> -.014 Higher 1970 .050 1989 .038

1963 to 2012 segment:

Lower 1966< -.114 1977> -.060 1988> -.059 1963> -.014 1968> -.013 2007> -.011 Higher 1970 .049 1986 .044

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

1966 -5.1 SD; 1977 +3.2 SD

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554B 1950 to 2012 63 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

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

1950 1999 0 .04 -.12 .18 -.22 -.12 .12 .08 -.21 .22 -.01 .30\*-.07 .02 .12 -.03 -.35 .13 -.17 -.08 .09 .11

1963 2012 0 .02 -.08 .17 -.12 -.05 .02 .05 .06 .01 .23 .29\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .310) is:

Lower 1978< -.042 1967< -.030 1950< -.019 1977> -.016 2003< -.014 1965> -.013 Higher 1989 .025 1955 .022

1950 to 1999 segment:

Lower 1978< -.051 1967< -.036 1950< -.028 1977> -.017 1969< -.014 1965> -.014 Higher 1989 .028 1955 .027

1963 to 2012 segment:

Lower 1978< -.063 1967< -.043 1977> -.022 2003< -.019 1965> -.019 1969< -.016 Higher 1989 .039 1970 .032

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

1950 -5.3 SD

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555A 1924 to 2012 89 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

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

1950 1999 -4 .10 -.06 .10 -.16 .13 .15 .25\* .01 .11 -.32 .15|-.13 .00 .08 -.08 -.28 -.23 -.16 -.01 .07 .11

1963 2012 -4 .16 -.03 -.01 .00 -.04 .07 .21\*-.09 .02 -.17 -.03| - - - - - - - - - -

[B] Entire series, effect on correlation ( .470) is:

Lower 2008< -.056 1970> -.052 1989> -.044 1995> -.017 1934> -.012 1954> -.010 Higher 1936 .143 1948 .029

1950 to 1999 segment:

Lower 1989> -.093 1970> -.079 1995> -.033 1966< -.023 1967< -.023 1991< -.019 Higher 1988 .078 1986 .039

1963 to 2012 segment:

Lower 2008< -.099 1989> -.086 1970> -.073 1995> -.032 1967< -.015 1966< -.015 Higher 1988 .084 1986 .043

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

1964 -.190 19 1 >> WARNING: Ring is not usually narrow

1965 -.592 19 1

1966 .413 19 1 >> WARNING: Ring is not usually narrow

1967 .659 19 1 >> WARNING: Ring is not usually narrow

1986 -.625 19 1

1988 -1.678 19 1

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1948 -5.6 SD; 1970 +3.1 SD; 1989 +4.2 SD; 2008 -5.3 SD

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555B 1913 to 2012 100 years Series 12

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

Lower 1984< -.021 1936> -.019 1971< -.017 2003< -.016 1913> -.015 1930< -.012 Higher 1948 .024 1988 .017

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

1971 -.291 19 1 >> WARNING: Ring is not usually narrow

2000 -.275 19 1 >> WARNING: Ring is not usually narrow

2001 -.302 19 1 >> WARNING: Ring is not usually narrow

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

1930 -5.3 SD

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558A 1907 to 2012 106 years Series 13

[B] Entire series, effect on correlation ( .525) is:

Lower 1915> -.025 1920< -.022 2009< -.016 1934< -.012 1917< -.009 1923> -.009 Higher 1936 .038 1988 .034

[D] 4 Absent rings: Year Master N series Absent

2009 .198 19 3 >> WARNING: Ring is not usually narrow

2010 -.270 19 2 >> WARNING: Ring is not usually narrow

2011 -.213 19 2 >> WARNING: Ring is not usually narrow

2012 .810 19 3 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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

1915 +3.0 SD; 1989 -4.8 SD

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558B 1940 to 2012 73 years Series 14

[B] Entire series, effect on correlation ( .562) is:

Lower 1968< -.047 2002< -.018 1963> -.017 2010> -.016 1946> -.014 1986> -.014 Higher 1988 .050 1970 .039

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557A 1923 to 2012 90 years Series 15

[B] Entire series, effect on correlation ( .696) is:

Lower 1956> -.025 1955< -.025 1946> -.014 1968> -.012 1988> -.010 2012< -.010 Higher 1936 .080 1970 .040

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

2007 -.140 19 1 >> WARNING: Ring is not usually narrow

2008 .447 19 2 >> WARNING: Ring is not usually narrow

2009 .198 19 3 >> WARNING: Ring is not usually narrow

2010 -.270 19 2 >> WARNING: Ring is not usually narrow

2011 -.213 19 2 >> WARNING: Ring is not usually narrow

2012 .810 19 3 >> 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

1954 -4.8 SD

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557B 1938 to 2012 75 years Series 16

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

Lower 2008< -.041 1948> -.022 1950> -.010 1966< -.009 1988> -.009 1976< -.007 Higher 1970 .068 1954 .029

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

2008 .447 19 2 >> WARNING: Ring is not usually narrow

2009 .198 19 3 >> WARNING: Ring is not usually narrow

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

1970 -5.0 SD

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559A 1898 to 2012 115 years Series 17

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

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

1963 2012 0 -.14 .15 -.08 .27 .03 -.09 -.13 .08 .11 -.10 .31\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .495) is:

Lower 1937< -.031 1989> -.025 1906> -.021 1971< -.017 1972< -.013 1980< -.013 Higher 1936 .091 1905 .036

1963 to 2012 segment:

Lower 1989> -.068 1971< -.036 1972< -.028 2010> -.024 1980< -.023 1990> -.021 Higher 1970 .076 1988 .062

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

1906 +3.9 SD; 1989 +3.1 SD; 1990 +3.6 SD

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559B 1910 to 2012 103 years Series 18

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

Lower 2012< -.025 1971< -.023 1941< -.020 1963< -.016 1954> -.015 1981< -.013 Higher 1936 .108 1988 .032

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560A 1942 to 2012 71 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

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

1942 1991 -10 .34\*-.03 .09 -.14 .05 -.05 -.03 -.19 -.06 .18 .32|-.24 .22 -.04 -.03 -.12 -.12 .02 .24 -.17 -.01

[B] Entire series, effect on correlation ( .347) is:

Lower 1949< -.045 1988> -.045 1946< -.025 1972< -.018 1948> -.017 1965> -.015 Higher 1954 .043 1989 .023

1942 to 1991 segment:

Lower 1949< -.056 1988> -.047 1946< -.039 1972< -.023 1965> -.017 1948> -.016 Higher 1954 .053 1989 .028

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

1988 +3.2 SD

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PART 7: DESCRIPTIVE STATISTICS: Final 13:47 Wed 05 Mar 2014 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 ()

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1 537A 1872 2012 141 5 2 .479 .88 2.73 .542 .786 .289 3.17 .508 .063 1

2 537B 1897 2012 116 5 0 .485 .93 2.43 .531 .754 .310 2.80 .387 -.040 1

3 538B 1894 2012 119 5 3 .402 .73 2.61 .564 .728 .379 3.01 .573 -.102 1

4 543B 1924 2012 89 4 0 .540 1.01 2.29 .458 .865 .202 2.63 .404 -.001 1

5 549A 1931 2012 82 3 0 .518 1.35 3.48 .809 .796 .349 3.06 .620 -.069 1

6 549B 1950 2012 63 2 0 .658 1.41 3.13 .798 .718 .369 2.40 .508 -.094 2

7 551A 1923 2012 90 4 0 .447 1.23 3.36 .651 .718 .285 2.69 .478 -.031 3

8 551B 1926 2012 87 3 0 .421 1.15 3.12 .613 .739 .316 2.60 .434 .004 1

9 552B 1944 2012 69 3 3 .333 1.43 3.76 .922 .822 .297 2.70 .566 .046 1

10 554B 1950 2012 63 2 2 .310 1.43 3.27 .943 .863 .328 2.51 .465 -.045 1

11 555A 1924 2012 89 4 2 .470 .93 2.65 .705 .744 .433 2.53 .417 -.104 1

12 555B 1913 2012 100 4 0 .532 .89 2.38 .607 .645 .557 2.58 .489 -.009 1

13 558A 1907 2012 106 4 0 .525 1.51 3.34 .851 .751 .321 2.77 .484 .004 1

14 558B 1940 2012 73 3 0 .562 1.41 3.40 .896 .789 .336 2.57 .506 -.033 1

15 557A 1923 2012 90 4 0 .696 1.37 3.09 .825 .738 .314 2.61 .440 -.034 1

16 557B 1938 2012 75 3 0 .624 1.49 3.52 .918 .831 .318 2.35 .345 -.026 1

17 559A 1898 2012 115 5 1 .495 1.43 3.13 .482 .651 .212 2.70 .429 .118 2

18 559B 1910 2012 103 4 0 .514 1.82 3.70 .774 .770 .226 2.56 .429 -.027 1

19 560A 1942 2012 71 3 1 .347 1.73 2.47 .466 .560 .225 2.41 .414 -.029 1

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Total or mean: 1741 70 14 .493 1.24 3.76 .682 .749 .318 3.17 .468 -.017

- = [ COFECHA FINALCOF ] = -