[] Dendrochronology Program Library Run 4 Program COF 14:12 Fri 13 Dec 2013 Page 1

[]

[] P R O G R A M C O F E C H A Version 6.06P 28838

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: 4

File of DATED series: USPLow\_ACSH\_4

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 1902 to 2012 111 years

Continuous time span is 1902 to 2012 111 years

Portion with two or more series is 1927 to 2012 86 years

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

\*C\* Number of dated series 17 \*C\*

\*O\* Master series 1902 2012 111 yrs \*O\*

\*F\* Total rings in all series 1220 \*F\*

\*E\* Total dated rings checked 1195 \*E\*

\*C\* Series intercorrelation .505 \*C\*

\*H\* Average mean sensitivity .254 \*H\*

\*A\* Segments, possible problems 28 \*A\*

\*\*\* Mean length of series 71.8 \*\*\*

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

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

No ring measurements of zero value

PART 2: TIME PLOT OF TREE-RING SERIES: 4 14:12 Fri 13 Dec 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

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

. . . . . . . . . . . . . . . . . . <=======> . 601A 1 1939 2012 74

. . . . . . . . . . . . . . . . . . <=======> . 601B 2 1939 2012 74

. . . . . . . . . . . . . . . . . . <======> . 604A 3 1946 2012 67

. . . . . . . . . . . . . . . . . . <=======> . 604B 4 1931 2012 82

. . . . . . . . . . . . . . . . . . <=======> . 605A 5 1935 2012 78

. . . . . . . . . . . . . . . . . . <======> . 605B 6 1944 2012 69

. . . . . . . . . . . . . . . . . <==========> . 618A 7 1902 2012 111

. . . . . . . . . . . . . . . . . . <========> . 618B 8 1927 2012 86

. . . . . . . . . . . . . . . . . . <======> . 621B 9 1943 2012 70

. . . . . . . . . . . . . . . . . . <======> . 624A 10 1949 2012 64

. . . . . . . . . . . . . . . . . . <=======> . 625A 11 1938 2012 75

. . . . . . . . . . . . . . . . . . <========> . 625B 12 1928 2012 85

. . . . . . . . . . . . . . . . . . <======> . 627A 13 1940 2012 73

. . . . . . . . . . . . . . . . . . <=====> . 627B 14 1952 2012 61

. . . . . . . . . . . . . . . . . . <======> . 628A 15 1948 2012 65

. . . . . . . . . . . . . . . . . . <=====> . 637A 16 1953 2012 60

. . . . . . . . . . . . . . . . . . . <==> . 637B 17 1987 2012 26

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

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: 4 14:12 Fri 13 Dec 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

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1950 -.973 14 2000 -1.099 17

1951 .717 14 2001 -.717 17

1902 3.329 1 1952 .023 15 2002 -.668 17

1903 1.826 1 1953 .594 16 2003 .034 17

1904 .424 1 1954 -.088 16 2004 .671 17

1905 .380 1 1955 .895 16 2005 1.530 17

1906 .382 1 1956 .044 16 2006 .039 17

1907 -4.184 1 1957 -.240 16 2007 -1.657 17

1908 -.314 1 1958 -.013 16 2008 .280 17

1909 .382 1 1959 .232 16 2009 .487 17

1910 -.878 1 1960 -2.427 16 2010 -1.445 17

1911 -1.313 1 1961 .630 16 2011 -.098 17

1912 .408 1 1962 .470 16 2012 .955 17

1913 -1.058 1 1963 1.111 16

1914 -.681 1 1964 -.073 16

1915 .286 1 1965 .105 16

1916 -.675 1 1966 .300 16

1917 -.228 1 1967 .348 16

1918 -.691 1 1968 -.441 16

1919 -.072 1 1969 .156 16

1920 1.502 1 1970 -1.144 16

1921 1.517 1 1971 -.186 16

1922 1.617 1 1972 -.568 16

1923 2.673 1 1973 .317 16

1924 1.569 1 1974 -1.620 16

1925 .316 1 1975 .197 16

1926 .312 1 1976 -.192 16

1927 .981 2 1977 -.294 16

1928 -.275 3 1978 .686 16

1929 -.907 3 1979 -.087 16

1930 -.209 3 1980 .172 16

1931 -.615 4 1981 .720 16

1932 -.959 4 1982 .262 16

1933 -1.432 4 1983 .735 16

1934 -.952 4 1984 -.143 16

1935 -.845 5 1985 .560 16

1936 .674 5 1986 -.674 16

1937 .905 5 1987 -.663 17

1938 1.108 6 1988 -2.675 17

1939 1.169 8 1989 -1.931 17

1940 .103 9 1990 .118 17

1941 -.159 9 1991 .814 17

1942 .247 9 1992 .121 17

1943 .253 10 1993 .051 17

1944 -.799 11 1994 .874 17

1945 -.296 11 1995 1.063 17

1946 -.770 12 1996 .077 17

1947 -.634 12 1997 .546 17

1948 -.519 13 1998 .118 17

1949 .120 14 1999 .046 17

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PART 4: Master Bar Plot: 4 14:12 Fri 13 Dec 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

1950-d 2000-d

1951--------C 2001--c

1902----------M 1952-----@ 2002--c

1903----------G 1953--------B 2003-----@

1904-------B 1954----@ 2004--------C

1905-------B 1955---------D 2005----------F

1906-------B 1956-----@ 2006-----@

1907q 1957---a 2007g

1908---a 1958----@ 2008------A

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

1910-d 1960j 2010f

1911e 1961--------C 2011----@

1912-------B 1962-------B 2012---------D

1913-d 1963---------D

1914--c 1964----@

1915------A 1965-----@

1916--c 1966------A

1917---a 1967-------A

1918--c 1968---b

1919----@ 1969-----A

1920----------F 1970-e

1921----------F 1971---a

1922----------F 1972--b

1923----------K 1973-------A

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

1925-------A 1975------A

1926------A 1976---a

1927---------D 1977---a

1928---a 1978--------C

1929-d 1979----@

1930---a 1980------A

1931--b 1981--------C

1932-d 1982------A

1933f 1983--------C

1934-d 1984----a

1935-c 1985--------B

1936--------C 1986--c

1937---------D 1987--c

1938---------D 1988k

1939---------E 1989h

1940-----@ 1990-----@

1941----a 1991---------C

1942------A 1992-----@

1943------A 1993-----@

1944-c 1994---------C

1945---a 1995---------D

1946--c 1996-----@

1947--c 1997--------B

1948--b 1998-----@

1949-----@ 1999-----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: 4 14:12 Fri 13 Dec 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 1920 1935 1950 1965 1980 1995

1949 1964 1979 1994 2009 2024

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

1 601A 1939 2012 .46 .73 .84 .85 .83

2 601B 1939 2012 .54 .77 .89 .85 .83

3 604A 1946 2012 .64 .49 .46 .68 .65

4 604B 1931 2012 .25B .08B .24B .74 .64 .63

5 605A 1935 2012 .24B .53 .61 .51 .55

6 605B 1944 2012 .53 .58 .65 .60 .61

7 618A 1902 2012 .37B .58 .48 .21B .35B .35B

8 618B 1927 2012 .42B .64 .54 .36A .40A .40B

9 621B 1943 2012 .53 .47 .18B .41A .40A

10 624A 1949 2012 .26B .27B .24B .22B .33A

11 625A 1938 2012 .22B .53 .72 .70 .75

12 625B 1928 2012 .15B .54 .57 .43B .64 .64

13 627A 1940 2012 .71 .63 .55 .62 .67

14 627B 1952 2012 .33B .50 .65 .70

15 628A 1948 2012 .12B .06B .26A .66 .71

16 637A 1953 2012 .55 .47 .73 .79

17 637B 1987 2012 .40A

Av segment correlation .30 .43 .49 .51 .58 .62

PART 6: POTENTIAL PROBLEMS: 4 14:12 Fri 13 Dec 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

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

601A 1939 to 2012 74 years Series 1

[B] Entire series, effect on correlation ( .673) is:

Lower 1947< -.048 1948> -.034 1950> -.012 2010> -.009 1955< -.009 1958< -.007 Higher 1988 .041 1960 .037

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

1947 1948 4.5 SD

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

1947 -5.7 SD

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

601B 1939 to 2012 74 years Series 2

[B] Entire series, effect on correlation ( .718) is:

Lower 1948> -.032 1947< -.026 1955< -.014 1950> -.014 2010> -.009 1958< -.007 Higher 1960 .050 1988 .045

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

1947 -4.7 SD

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604A 1946 to 2012 67 years Series 3

[B] Entire series, effect on correlation ( .547) is:

Lower 1977< -.086 2010> -.024 2004< -.019 1970> -.013 1965< -.013 2003< -.011 Higher 1974 .035 2007 .031

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

1977 -4.7 SD

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

604B 1931 to 2012 82 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

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1931 1960 -4 -.28 -.17 .04 -.25 -.24 -.30 .28\*-.06 .27 .24 .25| .13 .17 -.19 -.02 -.34 .04 -.20 -.11 -.12 .02

1935 1964 -2 -.01 -.29 .02 -.32 -.08 -.25 .30 -.14 .44\*-.20 .08|-.07 .17 -.14 .11 -.23 .28 -.17 .11 -.12 .16

1950 1979 -2 .22 -.38 -.06 -.27 .10 .00 .24 .00 .42\*-.40 .24|-.32 .05 -.18 .06 -.23 .21 -.09 .05 -.08 .21

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

Lower 1962< -.072 1960> -.030 1947> -.019 1948< -.017 1963< -.014 1987> -.013 Higher 1988 .074 1974 .027

1931 to 1960 segment:

Lower 1948< -.059 1947> -.049 1960> -.045 1959< -.012 1957> -.012 1946> -.009 Higher 1951 .038 1939 .031

1935 to 1964 segment:

Lower 1962< -.121 1947> -.041 1963< -.023 1957> -.012 1946> -.009 1952> -.007 Higher 1948 .033 1951 .032

1950 to 1979 segment:

Lower 1962< -.194 1960> -.058 1963< -.030 1957> -.014 1975< -.010 1952> -.008 Higher 1974 .101 1970 .058

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

1947 +3.6 SD; 1962 -5.2 SD

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605A 1935 to 2012 78 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

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1935 1964 -2 -.04 -.04 -.07 -.29 .16 .04 .05 .03 .30\*-.05 .24| .04 -.18 -.02 -.02 -.20 -.06 .02 .06 -.12 .30

[B] Entire series, effect on correlation ( .442) is:

Lower 1949< -.054 1960> -.027 2000> -.019 1946> -.012 2008< -.011 1948> -.010 Higher 1974 .045 2010 .039

1935 to 1964 segment:

Lower 1949< -.147 1946> -.032 1948> -.025 1960> -.023 1962< -.010 1947> -.010 Higher 1950 .052 1955 .040

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

1949 -4.6 SD; 1950 -5.0 SD

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605B 1944 to 2012 69 years Series 6

[B] Entire series, effect on correlation ( .576) is:

Lower 2012< -.030 2006> -.022 1969< -.021 1968> -.014 1970< -.010 1990< -.010 Higher 1988 .076 1974 .028

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

1970 -5.0 SD

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618A 1902 to 2012 111 years Series 7

[\*] Early part of series cannot be checked from 1902 to 1926 -- 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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1927 1956 -2 -.12 -.15 -.14 -.23 .17 -.09 .19 .22 .50\*-.03 .37|-.05 -.17 -.33 -.03 -.64 .04 -.19 .13 -.23 .46

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

1965 1994 -4 .14 -.05 -.16 -.18 -.07 -.35 .24\*-.05 .04 .13 .21| .18 .12 -.03 .09 -.06 -.19 -.20 .10 -.14 .05

1980 2009 1 .01 -.33 -.08 -.05 .11 -.16 .34 .07 -.13 -.14 .35| .37\*-.17 -.24 - - - - - - -

1983 2012 -4 .03 -.32 -.02 .00 .05 -.19 .36\* .08 -.18 -.13 .35| - - - - - - - - - -

[B] Entire series, effect on correlation ( .371) is:

Lower 2006< -.041 1992< -.028 1974> -.019 1927< -.016 1944> -.012 1969< -.012 Higher 1960 .069 1955 .013

1927 to 1956 segment:

Lower 1927< -.073 1944> -.050 1945> -.029 1941> -.025 1948> -.022 1936< -.018 Higher 1955 .050 1950 .041

1965 to 1994 segment:

Lower 1992< -.093 1974> -.047 1969< -.039 1967< -.038 1990< -.034 1966< -.023 Higher 1988 .046 1991 .042

1980 to 2009 segment:

Lower 2006< -.079 1992< -.054 2007> -.034 1990< -.022 1988> -.019 1995< -.017 Higher 2000 .031 2004 .021

1983 to 2012 segment:

Lower 2006< -.085 1992< -.055 2007> -.032 1990< -.020 1988> -.016 1995< -.013 Higher 2000 .026 1991 .022

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

1950 -4.8 SD

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618B 1927 to 2012 86 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

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1927 1956 10 -.01 -.07 -.15 -.02 .24 -.12 .20 .15 .19 .08 .42|-.11 .01 -.03 -.04 -.34 .07 -.05 -.28 -.25 .54\*

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

1965 1994 0 -.17 -.17 -.08 -.26 -.02 -.32 .18 .14 .31 .32 .36\* .05 -.10 .03 -.11 -.35 -.14 -.35 -.05 -.08 .01

1980 2009 0 -.06 -.05 .27 -.01 -.19 -.18 .26 -.02 -.12 .17 .40\*-.02 -.22 -.03 - - - - - - -

1983 2012 -8 .02 -.03 .41\* .02 -.26 -.24 .33 .02 -.22 .19 .40| - - - - - - - - - -

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

Lower 1996< -.036 1990< -.015 1971< -.013 1950< -.013 1953< -.012 2011< -.011 Higher 1960 .052 1989 .015

1927 to 1956 segment:

Lower 1953< -.051 1927> -.028 1950< -.027 1945> -.021 1948> -.017 1946> -.015 Higher 1951 .042 1939 .031

1965 to 1994 segment:

Lower 1990< -.052 1971< -.048 1992< -.025 1977> -.023 1986> -.021 1984> -.020 Higher 1988 .068 1989 .066

1980 to 2009 segment:

Lower 1996< -.089 1990< -.035 1997< -.017 1986> -.017 1984> -.015 2002> -.015 Higher 1989 .049 2000 .041

1983 to 2012 segment:

Lower 1996< -.086 1990< -.031 2011< -.023 2007> -.019 1986> -.018 2002> -.016 Higher 2005 .039 1989 .039

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621B 1943 to 2012 70 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

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

1965 1994 -8 .05 .03 .28\*-.05 -.12 .23 .04 -.05 -.17 -.25 .18|-.21 .25 -.14 .08 -.11 .02 -.12 -.19 .15 .07

1980 2009 0 .11 -.01 .10 .15 -.25 -.05 -.05 -.29 -.31 -.11 .41\*-.27 .03 .20 - - - - - - -

1983 2012 0 .17 .00 .13 .21 -.14 -.12 -.12 -.21 -.30 -.20 .40\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .400) is:

Lower 1988> -.039 2006> -.027 1989> -.023 1974> -.020 1975< -.019 1987> -.014 Higher 1960 .062 2007 .042

1965 to 1994 segment:

Lower 1975< -.054 1989> -.045 1988> -.042 1987> -.030 1974> -.024 1977< -.023 Higher 1986 .029 1990 .027

1980 to 2009 segment:

Lower 1988> -.085 2006> -.076 1989> -.052 1987> -.036 1996< -.021 1993< -.008 Higher 2007 .138 2000 .038

1983 to 2012 segment:

Lower 2006> -.068 1988> -.067 1989> -.046 1987> -.032 1996< -.022 2012< -.014 Higher 2007 .120 2000 .032

[E] Outliers 5 3.0 SD above or -4.5 SD below mean for year

1943 +3.3 SD; 1964 +3.1 SD; 1977 -4.6 SD; 1988 +4.0 SD; 1989 +3.5 SD

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

624A 1949 to 2012 64 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

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

1949 1978 -10 .67\*-.57 .08 -.14 .15 -.07 .17 -.24 .16 -.05 .26|-.24 .04 -.28 .39 -.35 .18 -.32 -.02 .14 .07

1950 1979 -10 .64\*-.53 .08 -.15 .11 .04 .15 -.22 .18 -.04 .27|-.20 -.03 -.30 .35 -.35 .11 -.30 .00 .17 .08

1965 1994 -10 .39\*-.47 .01 -.15 -.02 .12 -.06 -.13 -.05 .20 .24| .29 .23 -.29 .08 -.28 -.13 -.22 -.28 .16 -.02

1980 2009 -1 .05 -.15 -.12 -.28 -.20 .02 -.20 -.05 .00 .36\* .22| .33 .14 -.21 - - - - - - -

1983 2012 0 .15 -.10 -.04 -.18 -.27 -.18 -.12 .14 -.12 .23 .33\* - - - - - - - - - -

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

Lower 1987< -.034 2000> -.026 1975< -.022 1978< -.021 1951< -.018 2006> -.018 Higher 2010 .054 1970 .039

1949 to 1978 segment:

Lower 1975< -.052 1978< -.051 1951< -.043 1974> -.038 1968> -.028 1950> -.024 Higher 1970 .119 1960 .112

1950 to 1979 segment:

Lower 1975< -.051 1978< -.049 1974> -.044 1951< -.041 1968> -.031 1950> -.027 Higher 1970 .116 1960 .104

1965 to 1994 segment:

Lower 1987< -.057 1978< -.046 1975< -.045 1974> -.030 1968> -.019 1994< -.012 Higher 1970 .095 1991 .025

1980 to 2009 segment:

Lower 1987< -.068 2000> -.048 2006> -.033 1994< -.012 2007> -.009 1997< -.007 Higher 1988 .031 1995 .027

1983 to 2012 segment:

Lower 1987< -.084 2000> -.047 2006> -.031 2007> -.023 2002< -.011 1994< -.011 Higher 2010 .098 2012 .024

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

1969 +3.9 SD; 1987 -4.9 SD

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625A 1938 to 2012 75 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

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1938 1967 2 .00 -.34 .17 -.16 -.06 -.27 .05 -.26 .09 .15 .22| .11 .38\*-.11 -.02 -.09 -.01 -.30 -.08 .00 -.06

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

Lower 1948< -.046 1944> -.018 1990< -.018 1960> -.017 1987> -.017 1958< -.016 Higher 1988 .048 1974 .034

1938 to 1967 segment:

Lower 1950> -.032 1944> -.032 1948< -.028 1958< -.024 1941< -.018 1947> -.014 Higher 1960 .051 1963 .039

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

625B 1928 to 2012 85 years Series 12

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

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

1928 1957 4 .19 -.02 -.03 .06 -.21 -.31 -.17 -.39 -.38 -.30 .15|-.04 .35 .35 .41\*-.07 .29 -.27 .28 -.16 -.24

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

1965 1994 2 .00 -.32 .20 -.22 -.05 -.33 -.06 -.13 .35 -.09 .43| .20 .61\*-.13 .02 -.21 -.11 -.30 -.23 -.36 -.24

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

Lower 1972< -.022 1934> -.022 1973< -.019 1947> -.017 1994< -.017 1938< -.016 Higher 1960 .055 2007 .038

1928 to 1957 segment:

Lower 1934> -.073 1947> -.056 1938< -.049 1935> -.040 1951< -.027 1940< -.027 Higher 1955 .072 1944 .062

1965 to 1994 segment:

Lower 1972< -.072 1973< -.054 1994< -.046 1970> -.034 1989> -.027 1966< -.009 Higher 1988 .082 1974 .062

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

1934 +3.8 SD; 1935 +3.3 SD

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

627A 1940 to 2012 73 years Series 13

[B] Entire series, effect on correlation ( .634) is:

Lower 2006< -.045 1989> -.024 1968< -.016 1979> -.016 1982< -.014 1941> -.013 Higher 1988 .055 1960 .053

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

1979 +3.4 SD

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627B 1952 to 2012 61 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

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

1952 1981 10 .24 -.12 .31 -.01 .16 .03 .30 -.16 .06 -.34 .33|-.34 -.03 -.08 -.01 -.22 .02 .04 .23 .01 .35\*

[B] Entire series, effect on correlation ( .543) is:

Lower 1976< -.019 1979< -.016 1980< -.015 1953< -.013 1989< -.013 1960> -.012 Higher 1988 .057 2010 .022

1952 to 1981 segment:

Lower 1976< -.037 1980< -.030 1979< -.027 1953< -.025 1967< -.019 1952< -.019 Higher 1974 .042 1960 .037

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

628A 1948 to 2012 65 years Series 15

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

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

1948 1977 3 .04 .08 -.04 .16 -.06 -.16 -.29 .00 -.16 -.12 .12|-.07 -.11 .55\*-.05 .12 -.29 -.08 .20 -.19 -.02

1950 1979 3 .07 .02 .04 .13 -.03 -.20 -.19 -.01 -.16 -.09 .06|-.04 -.13 .52\*-.06 .09 -.28 -.12 .21 -.20 .05

1965 1994 0 -.06 -.02 -.04 -.08 -.16 -.24 .02 -.02 -.01 .09 .26\* .08 -.09 .15 .11 .01 -.12 -.19 .08 -.12 .19

[B] Entire series, effect on correlation ( .339) is:

Lower 1957< -.081 1974> -.060 1978< -.029 1955< -.026 1970> -.023 2000> -.023 Higher 1988 .078 1960 .070

1948 to 1977 segment:

Lower 1974> -.098 1957< -.084 1955< -.046 1970> -.034 1971< -.026 1950> -.026 Higher 1960 .220 1951 .038

1950 to 1979 segment:

Lower 1974> -.093 1957< -.046 1978< -.043 1955< -.039 1970> -.032 1950> -.026 Higher 1960 .227 1951 .037

1965 to 1994 segment:

Lower 1974> -.154 1978< -.079 1970> -.054 1971< -.053 1987> -.018 1968> -.017 Higher 1988 .287 1989 .048

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

1957 -5.2 SD; 1974 +4.8 SD

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

637A 1953 to 2012 60 years Series 16

[B] Entire series, effect on correlation ( .644) is:

Lower 1970> -.039 1974> -.030 1999< -.013 1981< -.013 1985< -.012 1961< -.009 Higher 1960 .080 1988 .035

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

1960 -4.6 SD; 1974 +3.0 SD

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

637B 1987 to 2012 26 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

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

1987 2012 0 .01 -.04 -.18 .04 -.28 -.26 -.17 .03 -.19 -.04 .40\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .397) is:

Lower 1999< -.069 1988> -.054 2006> -.042 1987> -.027 2009< -.022 1993< -.020 Higher 2005 .041 2010 .037

1987 to 2012 segment:

Lower 1999< -.069 1988> -.054 2006> -.042 1987> -.027 2009< -.022 1993< -.020 Higher 2005 .041 2010 .037

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PART 7: DESCRIPTIVE STATISTICS: 4 14:12 Fri 13 Dec 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 ()

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1 601A 1939 2012 74 5 0 .673 1.80 3.17 .668 .667 .259 2.65 .579 -.004 1

2 601B 1939 2012 74 5 0 .718 1.81 3.14 .657 .674 .256 2.60 .539 -.004 1

3 604A 1946 2012 67 5 0 .547 2.01 4.84 1.250 .878 .283 2.57 .500 -.054 1

4 604B 1931 2012 82 6 3 .409 1.84 5.26 1.238 .858 .292 2.63 .546 -.020 1

5 605A 1935 2012 78 5 1 .442 1.68 3.87 .747 .752 .246 2.48 .440 .042 1

6 605B 1944 2012 69 5 0 .576 1.79 4.03 .906 .811 .287 2.54 .461 .041 1

7 618A 1902 2012 111 6 4 .371 1.62 7.12 1.489 .907 .337 3.07 .438 -.069 1

8 618B 1927 2012 86 6 4 .470 1.58 3.87 .980 .857 .297 2.65 .529 -.048 1

9 621B 1943 2012 70 5 3 .400 1.84 5.22 .892 .779 .203 2.78 .465 -.190 1

10 624A 1949 2012 64 5 5 .310 1.76 6.87 1.173 .844 .285 2.80 .475 .015 1

11 625A 1938 2012 75 5 1 .549 2.17 3.87 .749 .792 .184 2.50 .504 -.020 1

12 625B 1928 2012 85 6 2 .515 2.04 4.08 .831 .787 .203 2.67 .479 -.006 1

13 627A 1940 2012 73 5 0 .634 2.13 3.98 .634 .584 .220 2.61 .550 -.036 1

14 627B 1952 2012 61 4 1 .543 2.38 5.17 1.136 .852 .219 2.53 .450 .135 1

15 628A 1948 2012 65 5 3 .339 2.02 3.12 .433 .527 .153 2.46 .420 -.030 2

16 637A 1953 2012 60 4 0 .644 2.40 4.80 1.207 .912 .235 2.47 .397 .062 1

17 637B 1987 2012 26 1 1 .397 1.62 3.42 .827 .647 .390 2.64 .706 .240 2

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Total or mean: 1220 83 28 .505 1.90 7.12 .947 .781 .254 3.07 .492 -.010

- = [ COFECHA 4 COF ] = -