[] Dendrochronology Program Library Run 69 Program COF 10:42 Mon 14 Mar 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27833

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: 69\_MAN\_Corrected

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 1925 to 2010 86 years

Continuous time span is 1925 to 2010 86 years

Portion with two or more series is 1925 to 2010 86 years

>> 404A 2008 absent in 5 of 28 series, but is not usually narrow: master index is -.362

>> 404A 2009 absent in 5 of 28 series, but is not usually narrow: master index is .270

>> 404A 2010 absent in 5 of 28 series, but is not usually narrow: master index is 1.908

>> 404B 2007 absent in 4 of 28 series, but is not usually narrow: master index is -.183

>> 404B 2008 absent in 5 of 28 series, but is not usually narrow: master index is -.362

>> 404B 2009 absent in 5 of 28 series, but is not usually narrow: master index is .270

>> 404B 2010 absent in 5 of 28 series, but is not usually narrow: master index is 1.908

>> 405B 2007 absent in 4 of 28 series, but is not usually narrow: master index is -.183

>> 405B 2008 absent in 5 of 28 series, but is not usually narrow: master index is -.362

>> 405B 2009 absent in 5 of 28 series, but is not usually narrow: master index is .270

>> 405B 2010 absent in 5 of 28 series, but is not usually narrow: master index is 1.908

>> 410A 2007 absent in 4 of 28 series, but is not usually narrow: master index is -.183

>> 410A 2008 absent in 5 of 28 series, but is not usually narrow: master index is -.362

>> 410A 2009 absent in 5 of 28 series, but is not usually narrow: master index is .270

>> 410A 2010 absent in 5 of 28 series, but is not usually narrow: master index is 1.908

>> 414A 2003 absent in 3 of 28 series, but is not usually narrow: master index is -.104

>> 414B 2003 absent in 3 of 28 series, but is not usually narrow: master index is -.104

>> Dead-1B 2003 absent in 3 of 28 series, but is not usually narrow: master index is -.104

>> Dead-1B 2007 absent in 4 of 28 series, but is not usually narrow: master index is -.183

>> Dead-1B 2008 absent in 5 of 28 series, but is not usually narrow: master index is -.362

>> Dead-1B 2009 absent in 5 of 28 series, but is not usually narrow: master index is .270

>> Dead-1B 2010 absent in 5 of 28 series, but is not usually narrow: master index is 1.908

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

\*C\* Number of dated series 28 \*C\*

\*O\* Master series 1925 2010 86 yrs \*O\*

\*F\* Total rings in all series 2196 \*F\*

\*E\* Total dated rings checked 2196 \*E\*

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

\*H\* Average mean sensitivity .238 \*H\*

\*A\* Segments, possible problems 22 \*A\*

\*\*\* Mean length of series 78.4 \*\*\*

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

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

404A 3 absent rings: 2008 2009 2010

404B 5 absent rings: 2006 2007 2008 2009 2010

405B 4 absent rings: 2007 2008 2009 2010

410A 6 absent rings: 2005 2006 2007 2008 2009 2010

412B 1 absent rings: 1985

414A 3 absent rings: 1985 2003 2004

414B 2 absent rings: 2003 2004

Dead-1B 8 absent rings: 2003 2004 2005 2006 2007 2008 2009 2010

32 absent rings 1.457%

PART 2: TIME PLOT OF TREE-RING SERIES: 10:42 Mon 14 Mar 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

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

. . . . . . . . . . . . . . . . . . <=======> . 402A 1 1939 2010 72

. . . . . . . . . . . . . . . . . . <=======> . 402B 2 1932 2010 79

. . . . . . . . . . . . . . . . . . <========> . 403A 3 1925 2010 86

. . . . . . . . . . . . . . . . . . <========> . 403B 4 1928 2010 83

. . . . . . . . . . . . . . . . . . <=======> . 404A 5 1933 2010 78

. . . . . . . . . . . . . . . . . . <========> . 404B 6 1929 2010 82

. . . . . . . . . . . . . . . . . . <========> . 405A 7 1927 2010 84

. . . . . . . . . . . . . . . . . . <=======> . 405B 8 1931 2010 80

. . . . . . . . . . . . . . . . . . <========> . 406A 9 1925 2010 86

. . . . . . . . . . . . . . . . . . <========> . 407A 10 1928 2010 83

. . . . . . . . . . . . . . . . . . <========> . 407B 11 1926 2010 85

. . . . . . . . . . . . . . . . . . <========> . 408A 12 1929 2010 82

. . . . . . . . . . . . . . . . . . <=======> . 408B 13 1931 2010 80

. . . . . . . . . . . . . . . . . . <======> . 409A 14 1944 2010 67

. . . . . . . . . . . . . . . . . . <=====> . 409B 15 1952 2010 59

. . . . . . . . . . . . . . . . . . <=======> . 410A 16 1935 2010 76

. . . . . . . . . . . . . . . . . . <=======> . 410B 17 1932 2010 79

. . . . . . . . . . . . . . . . . . <========> . 411A 18 1928 2010 83

. . . . . . . . . . . . . . . . . . <========> . 411B 19 1928 2010 83

. . . . . . . . . . . . . . . . . . <======> . 412A 20 1947 2010 64

. . . . . . . . . . . . . . . . . . <======> . 412B 21 1941 2010 70

. . . . . . . . . . . . . . . . . . <========> . 413A 22 1929 2010 82

. . . . . . . . . . . . . . . . . . <=======> . 413B 23 1935 2010 76

. . . . . . . . . . . . . . . . . . <========> . 414A 24 1928 2010 83

. . . . . . . . . . . . . . . . . . <=======> . 414B 25 1933 2010 78

. . . . . . . . . . . . . . . . . . <=======> . Dead-1A 26 1933 2010 78

. . . . . . . . . . . . . . . . . . <=======> . Dead-1B 27 1933 2010 78

. . . . . . . . . . . . . . . . . . <=======> . 406B 28 1931 2010 80

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

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: 10:42 Mon 14 Mar 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

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

1950 -.718 27 2000 .166 28

1951 .802 27 2001 1.734 28

1952 .469 28 2002 .940 28

1953 -.126 28 2003 -.104 28 3<<

1954 1.369 28 2004 -1.435 28 3

1955 1.705 28 2005 -.863 28 2

1956 -2.946 28 2006 -.601 28 3

1957 .747 28 2007 -.183 28 4<<

1958 1.252 28 2008 -.362 28 5<<

1959 1.037 28 2009 .270 28 5<<

1960 -.223 28 2010 1.908 28 5<<

1961 1.153 28

1962 -.314 28

1963 .085 28

1964 .170 28

1965 -1.372 28

1966 -.908 28

1967 -.819 28

1968 -1.904 28

1969 -.840 28

1970 .177 28

1971 1.377 28

1972 .597 28

1973 .372 28

1974 -.074 28

1925 -1.190 2 1975 1.086 28

1926 -1.852 3 1976 .390 28

1927 -1.862 4 1977 -.290 28

1928 -.597 9 1978 .742 28

1929 -.698 12 1979 .624 28

1930 -.182 12 1980 1.398 28

1931 .680 15 1981 .119 28

1932 1.356 17 1982 -1.429 28

1933 -.762 21 1983 -.172 28

1934 .390 21 1984 -1.018 28

1935 1.212 23 1985 -1.852 28 2

1936 -1.331 23 1986 -2.134 28

1937 .172 23 1987 -.234 28

1938 1.707 23 1988 .022 28

1939 1.111 24 1989 -.310 28

1940 -.322 24 1990 .169 28

1941 -.241 25 1991 -.757 28

1942 -.042 25 1992 .363 28

1943 -.072 25 1993 1.046 28

1944 -.934 26 1994 1.287 28

1945 -.135 26 1995 .944 28

1946 -.474 26 1996 -.477 28

1947 -.002 27 1997 1.026 28

1948 -.893 27 1998 .008 28

1949 .377 27 1999 1.495 28

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PART 4: Master Bar Plot: 10:42 Mon 14 Mar 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

1950--c 2000------A

1951--------C 2001----------G

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

1953----a 2003----@

1954---------E 2004f

1955----------G 2005-c

1956l 2006--b

1957--------C 2007----a

1958---------E 2008---a

1959--------D 2009------A

1960----a 2010----------H

1961---------E

1962---a

1963------@

1964------A

1965-e

1966-d

1967--c

1968h

1969-c

1970------A

1971---------F

1972-------B

1973-------A

1974-----@

1925-e 1975---------D

1926g 1976-------B

1927g 1977---a

1928--b 1978--------C

1929--c 1979-------B

1930----a 1980---------F

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

1932---------E 1982f

1933--c 1983----a

1934-------B 1984-d

1935---------E 1985g

1936-e 1986i

1937------A 1987----a

1938----------G 1988-----@

1939---------D 1989---a

1940---a 1990------A

1941----a 1991--c

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

1943-----@ 1993--------D

1944-d 1994---------E

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

1946---b 1996---b

1947-----@ 1997--------D

1948-d 1998-----@

1949-------B 1999----------F

PART 5: CORRELATION OF SERIES BY SEGMENTS: 10:42 Mon 14 Mar 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 1920 1935 1950 1965 1980 1995

1949 1964 1979 1994 2009 2024

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

1 402A 1939 2010 .76 .80 .69 .70 .74

2 402B 1932 2010 .77 .83 .85 .67 .72 .74

3 403A 1925 2010 .53 .82 .91 .78 .74 .76

4 403B 1928 2010 .74 .78 .85 .74 .81 .85

5 404A 1933 2010 .57 .58 .59 .50 .55 .51

6 404B 1929 2010 .77 .79 .77 .60 .53 .50

7 405A 1927 2010 .42A .52 .58 .40A .44 .50

8 405B 1931 2010 .84 .82 .85 .64 .53 .50

9 406A 1925 2010 .62 .74 .67 .50 .56 .58

10 407A 1928 2010 .66 .72 .68 .65 .58 .61

11 407B 1926 2010 .67 .71 .74 .50 .52 .56

12 408A 1929 2010 .82 .82 .79 .65 .53 .57

13 408B 1931 2010 .82 .81 .88 .68 .59 .59

14 409A 1944 2010 .63 .65 .33B .32B .31B

15 409B 1952 2010 .67 .04B .19B .22B

16 410A 1935 2010 .79 .85 .64 .47 .49

17 410B 1932 2010 .71 .69 .86 .71 .65 .58

18 411A 1928 2010 .53 .57 .76 .79 .71 .72

19 411B 1928 2010 .68 .73 .77 .54 .78 .78

20 412A 1947 2010 .55 .51 .46 .44B .42B

21 412B 1941 2010 .72 .83 .58 .64 .67

22 413A 1929 2010 .83 .83 .77 .37B .42A .42

23 413B 1935 2010 .48 .53 .53 .49 .48

24 414A 1928 2010 .66 .76 .85 .61 .62 .64

25 414B 1933 2010 .70 .74 .87 .72 .63 .67

26 Dead-1A 1933 2010 .68 .67 .74 .59 .38A .40A

27 Dead-1B 1933 2010 .30B .29B .25B .39A .53 .50

28 406B 1931 2010 .45 .40A .44 .18B .15B .18B

Av segment correlation .65 .69 .73 .55 .54 .55

PART 6: POTENTIAL PROBLEMS: 10:42 Mon 14 Mar 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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402A 1939 to 2010 72 years Series 1

[B] Entire series, effect on correlation ( .734) is:

Lower 1973< -.015 1984< -.014 1950> -.013 2005> -.009 1988> -.006 1940< -.006 Higher 1956 .022 2010 .010

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402B 1932 to 2010 79 years Series 2

[B] Entire series, effect on correlation ( .727) is:

Lower 1932< -.031 1940> -.026 1966> -.014 1973< -.011 1933> -.006 1936> -.006 Higher 1956 .121 2010 .009

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403A 1925 to 2010 86 years Series 3

[B] Entire series, effect on correlation ( .757) is:

Lower 1927> -.017 1941< -.011 2002< -.011 1939< -.010 1944> -.010 1943< -.010 Higher 1956 .106 2001 .006

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403B 1928 to 2010 83 years Series 4

[B] Entire series, effect on correlation ( .747) is:

Lower 1929< -.024 1937< -.015 1944> -.014 1941< -.010 1935< -.008 1957< -.007 Higher 1956 .104 2001 .007

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404A 1933 to 2010 78 years Series 5

[B] Entire series, effect on correlation ( .510) is:

Lower 2004> -.026 1960> -.023 2010< -.021 1951< -.016 1971< -.013 2008< -.013 Higher 1956 .063 1936 .024

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

2008 -.362 28 5 >> WARNING: Ring is not usually narrow

2009 .270 28 5 >> WARNING: Ring is not usually narrow

2010 1.908 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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

404B 1929 to 2010 82 years Series 6

[B] Entire series, effect on correlation ( .591) is:

Lower 2004> -.030 2010< -.021 1962> -.019 1986> -.014 1933> -.013 1950> -.011 Higher 1956 .104 1985 .014

[D] 5 Absent rings: Year Master N series Absent

2006 -.601 28 3

2007 -.183 28 4 >> WARNING: Ring is not usually narrow

2008 -.362 28 5 >> WARNING: Ring is not usually narrow

2009 .270 28 5 >> WARNING: Ring is not usually narrow

2010 1.908 28 5 >> 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

1982 -4.6 SD

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405A 1927 to 2010 84 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

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

1927 1956 0 - - - - - - - - .00 -.09 .42\*-.19 .03 .11 .01 -.20 .41 -.12 -.11 .27 -.04

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

1965 1994 0 .06 .32 -.07 -.06 -.16 .02 .06 .10 -.34 -.13 .40\* .08 .16 -.23 -.19 .18 -.28 -.02 .04 .28 -.12

[B] Entire series, effect on correlation ( .478) is:

Lower 1985> -.017 1938< -.012 1956> -.011 1977< -.011 1986> -.010 1927< -.010 Higher 2004 .021 1965 .014

1927 to 1956 segment:

Lower 1927< -.063 1942< -.025 1938< -.022 1948> -.015 1939< -.015 1929> -.012 Higher 1956 .029 1955 .029

1965 to 1994 segment:

Lower 1985> -.062 1986> -.038 1982> -.028 1977< -.027 1980< -.017 1972< -.014 Higher 1965 .064 1978 .027

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405B 1931 to 2010 80 years Series 8

[B] Entire series, effect on correlation ( .670) is:

Lower 2004> -.048 2010< -.021 2005> -.015 1994< -.013 1989< -.009 1946> -.008 Higher 1956 .118 1982 .012

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

2007 -.183 28 4 >> WARNING: Ring is not usually narrow

2008 -.362 28 5 >> WARNING: Ring is not usually narrow

2009 .270 28 5 >> WARNING: Ring is not usually narrow

2010 1.908 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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406A 1925 to 2010 86 years Series 9

[B] Entire series, effect on correlation ( .623) is:

Lower 1984> -.024 1982> -.018 1927> -.018 1950< -.017 1975< -.011 2004< -.009 Higher 1956 .027 1985 .010

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

1984 +3.2 SD

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407A 1928 to 2010 83 years Series 10

[B] Entire series, effect on correlation ( .611) is:

Lower 1996< -.062 1956> -.022 1928< -.017 1976> -.009 1984> -.006 1929> -.006 Higher 1936 .023 2004 .015

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407B 1926 to 2010 85 years Series 11

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

Lower 1984< -.024 1941< -.017 2000< -.013 1961< -.012 1991> -.010 1944< -.009 Higher 1956 .046 1936 .019

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408A 1929 to 2010 82 years Series 12

[B] Entire series, effect on correlation ( .707) is:

Lower 1997< -.022 2000> -.015 1996> -.013 1970< -.013 1977> -.012 1948> -.009 Higher 1956 .094 1936 .016

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408B 1931 to 2010 80 years Series 13

[B] Entire series, effect on correlation ( .732) is:

Lower 1981> -.026 1944> -.015 2003> -.015 1948> -.008 1997< -.008 2004< -.006 Higher 1956 .058 1985 .009

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

1981 +3.1 SD

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

409A 1944 to 2010 67 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 5 .15 .17 -.22 .04 -.10 .02 .06 -.30 -.05 .05 .33| .17 .00 .11 -.16 .33\*-.20 .10 .02 -.02 -.07

1980 2009 -5 .01 .20 -.07 .24 .03 .39\* .31 -.11 .10 .08 .32|-.04 - - - - - - - - -

1981 2010 -5 -.01 .18 -.07 .23 .00 .34\* .30 -.09 .07 .07 .31| - - - - - - - - - -

[B] Entire series, effect on correlation ( .521) is:

Lower 1985> -.041 1962< -.019 2004> -.019 1946> -.019 1968> -.012 1984> -.009 Higher 1956 .088 1986 .014

1965 to 1994 segment:

Lower 1985> -.119 1968> -.032 1984> -.027 1982> -.020 1990< -.019 1993< -.017 Higher 1986 .057 1994 .037

1980 to 2009 segment:

Lower 1985> -.118 2004> -.049 1984> -.026 1990< -.020 1998> -.017 1993< -.017 Higher 1986 .062 2001 .056

1981 to 2010 segment:

Lower 1985> -.116 2004> -.047 1984> -.026 1998> -.018 1990< -.018 1993< -.015 Higher 1986 .062 2001 .056

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

1985 +3.1 SD

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409B 1952 to 2010 59 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

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

1965 1994 10 .00 .27 .11 .19 -.08 -.23 .05 -.43 .08 -.23 .04| .04 -.04 .31 -.31 .19 -.16 -.02 .02 -.10 .44\*

1980 2009 -9 -.10 .40\* .21 .34 -.05 .00 .15 -.18 .12 -.11 .19| .14 - - - - - - - - -

1981 2010 -9 -.14 .41\* .21 .31 -.12 -.06 .13 -.15 .09 -.11 .22| - - - - - - - - - -

[B] Entire series, effect on correlation ( .500) is:

Lower 1993< -.078 1968> -.043 1985> -.025 2004> -.021 1976< -.020 1994< -.013 Higher 1956 .241 2001 .017

1965 to 1994 segment:

Lower 1993< -.145 1968> -.086 1985> -.045 1994< -.024 1976< -.019 1984> -.015 Higher 1986 .080 1971 .058

1980 to 2009 segment:

Lower 1993< -.179 1985> -.053 2004> -.043 1994< -.029 1996> -.021 1984> -.017 Higher 2001 .084 1999 .077

1981 to 2010 segment:

Lower 1993< -.174 1985> -.052 2004> -.042 1994< -.028 1996> -.020 1984> -.017 Higher 2001 .076 1999 .070

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410A 1935 to 2010 76 years Series 16

[B] Entire series, effect on correlation ( .636) is:

Lower 1986< -.030 2010< -.022 1937< -.015 1982> -.011 2004> -.011 1944> -.009 Higher 1956 .086 1936 .019

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

2005 -.863 28 2

2006 -.601 28 3

2007 -.183 28 4 >> WARNING: Ring is not usually narrow

2008 -.362 28 5 >> WARNING: Ring is not usually narrow

2009 .270 28 5 >> WARNING: Ring is not usually narrow

2010 1.908 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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410B 1932 to 2010 79 years Series 17

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

Lower 1948> -.041 2010< -.025 1944> -.019 1996> -.009 2008> -.008 1992< -.006 Higher 1956 .079 2004 .013

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

1948 +3.4 SD

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

411A 1928 to 2010 83 years Series 18

[B] Entire series, effect on correlation ( .632) is:

Lower 1948< -.056 1956> -.021 1930< -.017 1936> -.012 1996< -.012 1969< -.005 Higher 2010 .011 2004 .011

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

1948 -5.2 SD

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

411B 1928 to 2010 83 years Series 19

[B] Entire series, effect on correlation ( .674) is:

Lower 1948< -.043 1965> -.018 1936> -.016 1970< -.011 1928< -.011 1971< -.009 Higher 1956 .095 2004 .013

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412A 1947 to 2010 64 years Series 20

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

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

1980 2009 -1 -.21 .10 -.25 -.15 -.43 -.03 -.11 .23 .13 .53\* .44| .26 - - - - - - - - -

1981 2010 -1 -.22 .10 -.25 -.15 -.42 -.05 -.11 .24 .11 .53\* .42| - - - - - - - - - -

[B] Entire series, effect on correlation ( .467) is:

Lower 1978< -.029 1976< -.028 2005< -.024 1965> -.023 1949< -.016 1959< -.016 Higher 1956 .105 1985 .020

1980 to 2009 segment:

Lower 2005< -.078 1999< -.050 2007< -.045 2004> -.028 2000> -.024 1998> -.015 Higher 1985 .065 1982 .059

1981 to 2010 segment:

Lower 2005< -.072 1999< -.045 2007< -.041 2004> -.025 2000> -.025 1998> -.016 Higher 1985 .065 1982 .059

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

412B 1941 to 2010 70 years Series 21

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

Lower 1946< -.017 1944> -.017 1960> -.017 1969< -.015 1981> -.014 1977> -.011 Higher 1956 .157 1968 .010

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

1985 -1.852 28 2

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

1969 -4.7 SD

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413A 1929 to 2010 82 years Series 22

[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 5 -.29 .17 -.17 -.12 -.06 .03 .07 .13 -.11 -.22 .37|-.14 -.37 -.01 .22 .37\*-.14 .21 .35 .28 -.12

1980 2009 0 -.30 -.20 -.26 .19 -.18 .21 -.06 -.03 -.15 .04 .42\* .24 - - - - - - - - -

[B] Entire series, effect on correlation ( .642) is:

Lower 1985> -.022 1966> -.016 1967> -.015 1950> -.014 1998> -.013 1978< -.012 Higher 1956 .150 1968 .011

1965 to 1994 segment:

Lower 1985> -.077 1966> -.050 1967> -.046 1978< -.040 1988< -.026 1984> -.016 Higher 1968 .079 1993 .043

1980 to 2009 segment:

Lower 1985> -.063 1998> -.034 2001< -.031 1988< -.031 2006> -.009 1984> -.009 Higher 1993 .032 2004 .030

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

1967 +3.0 SD

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413B 1935 to 2010 76 years Series 23

[B] Entire series, effect on correlation ( .448) is:

Lower 1936> -.037 2003< -.036 1939< -.017 1956> -.015 1985> -.013 1998> -.011 Higher 1982 .024 1938 .021

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414A 1928 to 2010 83 years Series 24

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

Lower 1932< -.025 1933> -.019 1928> -.017 1986> -.017 1960> -.011 1935< -.010 Higher 1956 .165 1985 .012

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

1985 -1.852 28 2

2003 -.104 28 3 >> WARNING: Ring is not usually narrow

2004 -1.435 28 3

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

414B 1933 to 2010 78 years Series 25

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

Lower 1933> -.019 1935< -.019 1960> -.017 1944> -.016 1939< -.015 1941> -.011 Higher 1956 .135 1936 .012

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

2003 -.104 28 3 >> WARNING: Ring is not usually narrow

2004 -1.435 28 3

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

Dead-1A 1933 to 2010 78 years Series 26

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

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

1980 2009 0 -.15 .11 .18 .02 -.11 -.14 .15 .20 -.07 -.14 .38\*-.13 - - - - - - - - -

1981 2010 0 -.18 .14 .19 -.02 -.17 -.19 .14 .22 -.09 -.13 .40\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .542) is:

Lower 2004> -.037 1999< -.022 2005> -.018 1947< -.015 1948> -.014 1970< -.009 Higher 1956 .092 1982 .017

1980 to 2009 segment:

Lower 2004> -.111 1999< -.058 2005> -.044 1981> -.018 2003> -.016 1986> -.009 Higher 1985 .107 1982 .072

1981 to 2010 segment:

Lower 2004> -.107 1999< -.056 2005> -.043 1981> -.018 2003> -.016 1986> -.009 Higher 1985 .093 1982 .068

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

2005 +3.2 SD

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

Dead-1B 1933 to 2010 78 years Series 27

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

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

1933 1962 -6 - - -.21 -.05 .47\*-.18 -.02 -.10 .21 -.31 .30|-.13 .08 .10 .11 -.20 .17 .01 -.17 -.24 .44

1935 1964 -6 .19 -.21 -.27 -.04 .43\*-.20 -.04 -.07 .23 -.32 .29|-.11 .08 .07 .16 -.13 .18 .00 -.17 -.23 .43

1950 1979 -6 .06 .06 -.04 -.05 .36\* .02 -.12 -.21 .11 -.31 .25|-.01 -.01 .17 .04 -.12 -.01 .02 -.06 .13 -.03

1965 1994 0 -.01 .21 .13 -.11 .09 .31 -.10 .00 -.21 .16 .39\* .14 -.09 -.08 .00 -.21 -.24 -.25 -.11 .30 -.20

[B] Entire series, effect on correlation ( .378) is:

Lower 1956> -.104 1973< -.034 1958< -.023 1946< -.012 1996> -.010 1982> -.010 Higher 2001 .026 1985 .025

1933 to 1962 segment:

Lower 1956> -.194 1958< -.047 1946< -.028 1934< -.019 1942< -.018 1948> -.015 Higher 1938 .039 1957 .033

1935 to 1964 segment:

Lower 1956> -.197 1958< -.050 1946< -.027 1942< -.019 1948> -.014 1963< -.006 Higher 1938 .038 1957 .032

1950 to 1979 segment:

Lower 1956> -.202 1973< -.071 1958< -.048 1969> -.009 1963< -.005 1950> -.003 Higher 1971 .038 1957 .036

1965 to 1994 segment:

Lower 1973< -.119 1982> -.050 1994< -.028 1987< -.028 1968> -.027 1981> -.022 Higher 1985 .091 1971 .064

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

2003 -.104 28 3 >> WARNING: Ring is not usually narrow

2004 -1.435 28 3

2005 -.863 28 2

2006 -.601 28 3

2007 -.183 28 4 >> WARNING: Ring is not usually narrow

2008 -.362 28 5 >> WARNING: Ring is not usually narrow

2009 .270 28 5 >> WARNING: Ring is not usually narrow

2010 1.908 28 5 >> 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

2001 +3.5 SD

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

406B 1931 to 2010 80 years Series 28

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

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

1935 1964 0 -.11 .22 -.13 -.18 .00 -.22 .01 .29 .03 -.11 .40\*-.09 -.30 .03 -.04 -.11 -.07 -.16 .32 .09 -.05

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

1965 1994 8 -.12 .15 .05 .04 .02 -.08 .21 .03 -.01 -.27 .18| .13 -.38 .06 .11 .12 -.22 -.15 .23\*-.02 .11

1980 2009 -2 -.30 .17 .00 .17 .06 -.04 .13 -.15 .19\*-.09 .15| .01 - - - - - - - - -

1981 2010 -9 -.33 .20\* .01 .12 -.02 -.09 .12 -.13 .16 -.08 .18| - - - - - - - - - -

[B] Entire series, effect on correlation ( .363) is:

Lower 1956> -.031 1981< -.030 1984> -.023 1988< -.021 1982> -.018 1945< -.017 Higher 2004 .026 1936 .024

1935 to 1964 segment:

Lower 1945< -.075 1956> -.044 1959< -.032 1958< -.027 1947< -.015 1937< -.011 Higher 1936 .066 1954 .030

1965 to 1994 segment:

Lower 1984> -.066 1982> -.058 1988< -.049 1985> -.043 1981< -.035 1992< -.018 Higher 1968 .069 1971 .055

1980 to 2009 segment:

Lower 1984> -.054 1982> -.045 1988< -.038 2003> -.032 1985> -.032 1996> -.027 Higher 2004 .098 1980 .035

1981 to 2010 segment:

Lower 1984> -.053 1982> -.045 1988< -.038 1985> -.032 2003> -.032 1996> -.027 Higher 2004 .091 2010 .074

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

1984 +3.3 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 ()

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

1 402A 1939 2010 72 5 0 .734 .88 1.98 .470 .901 .187 2.78 .629 -.105 1

2 402B 1932 2010 79 6 0 .727 1.10 2.31 .412 .728 .208 2.50 .386 -.065 1

3 403A 1925 2010 86 6 0 .757 .93 2.37 .616 .942 .167 2.46 .327 -.054 1

4 403B 1928 2010 83 6 0 .747 1.12 2.62 .864 .946 .231 2.48 .395 -.052 1

5 404A 1933 2010 78 6 0 .510 .80 3.69 .964 .944 .262 2.57 .408 -.088 1

6 404B 1929 2010 82 6 0 .591 .62 2.61 .667 .932 .351 2.70 .433 -.016 1

7 405A 1927 2010 84 6 2 .478 .92 4.27 1.075 .958 .233 3.00 .510 -.005 4

8 405B 1931 2010 80 6 0 .670 .91 3.27 .901 .954 .289 2.48 .438 -.052 3

9 406A 1925 2010 86 6 0 .623 1.11 3.66 .876 .915 .218 2.53 .448 -.001 1

10 407A 1928 2010 83 6 0 .611 .99 4.00 1.009 .916 .233 2.52 .396 -.079 1

11 407B 1926 2010 85 6 0 .644 .80 2.97 .761 .937 .216 2.62 .526 -.065 2

12 408A 1929 2010 82 6 0 .707 1.33 2.90 .783 .886 .222 2.56 .456 -.092 1

13 408B 1931 2010 80 6 0 .732 .99 2.29 .582 .828 .217 2.68 .509 -.039 1

14 409A 1944 2010 67 5 3 .521 .72 1.49 .242 .704 .202 2.57 .557 -.044 1

15 409B 1952 2010 59 4 3 .500 1.14 2.86 .625 .863 .169 2.52 .461 -.083 1

16 410A 1935 2010 76 5 0 .636 .90 1.91 .523 .882 .224 2.72 .431 -.025 1

17 410B 1932 2010 79 6 0 .662 .86 1.79 .410 .853 .212 2.62 .461 -.034 1

18 411A 1928 2010 83 6 0 .632 .82 2.40 .747 .936 .293 2.55 .412 -.037 2

19 411B 1928 2010 83 6 0 .674 .97 3.03 .863 .939 .293 2.60 .455 -.015 1

20 412A 1947 2010 64 5 2 .467 1.07 2.61 .773 .961 .186 2.88 .613 .016 1

21 412B 1941 2010 70 5 0 .706 1.11 2.70 .826 .921 .274 2.49 .391 -.034 1

22 413A 1929 2010 82 6 2 .642 1.31 3.04 .739 .877 .178 2.41 .390 -.028 1

23 413B 1935 2010 76 5 0 .448 1.06 2.51 .594 .902 .166 2.77 .459 .034 1

24 414A 1928 2010 83 6 0 .673 .83 2.85 .765 .919 .396 2.55 .333 -.003 1

25 414B 1933 2010 78 6 0 .706 .99 3.05 .929 .941 .328 2.52 .379 -.038 1

26 Dead-1A 1933 2010 78 6 2 .542 1.00 2.51 .768 .933 .223 2.53 .455 -.078 1

27 Dead-1B 1933 2010 78 6 4 .378 1.00 2.65 .853 .945 .264 3.37 .603 .017 1

28 406B 1931 2010 80 6 4 .363 1.05 2.89 .580 .855 .179 2.56 .481 -.013 1

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Total or mean: 2196 160 22 .613 .98 4.27 .728 .902 .238 3.37 .452 -.038

- = [ COFECHA 69 COF ] = -