[] Dendrochronology Program Library Run BFMID Program COF 00:00 ®¯® 00 0000 Page 1

[]

[] P R O G R A M C O F E C H A Version 6.06P -30

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

QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: BFmid3.txt

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 0.3281

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 1894 to 2011 118 years

Continuous time span is 1894 to 2011 118 years

Portion with two or more series is 1894 to 2011 118 years

>> 15a0t44A 1999 absent in 1 of 36 series, but is not usually narrow: master index is -0.064

>> 15a0t44A 2000 absent in 1 of 36 series, but is not usually narrow: master index is -0.180

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

\*C\* Number of dated series 36 \*C\*

\*O\* Master series 1894 2011 118 yrs \*O\*

\*F\* Total rings in all series 2563 \*F\*

\*E\* Total dated rings checked 2563 \*E\*

\*C\* Series intercorrelation 0.418 \*C\*

\*H\* Average mean sensitivity 0.194 \*H\*

\*A\* Segments, possible problems 26 \*A\*

\*\*\* Mean length of series 71.2 \*\*\*

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

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

14a0t27A 1 absent rings: 1967

15a0t44A 2 absent rings: 1999 2000

3 absent rings 0.117%

PART 2: TIME PLOT OF TREE-RING SERIES: 00:00 ®¯® 00 0000 Page 2

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

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

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

. . . . . . . . . . . . . . . . . . <=======> . 05a0211A 1 1939 2011 73

. . . . . . . . . . . . . . . . . . <=======> . 05a0211B 2 1939 2011 73

. . . . . . . . . . . . . . . . . <===========> . 05a0t31A 3 1898 2011 114

. . . . . . . . . . . . . . . . . <===========> . 05a0t31B 4 1898 2011 114

. . . . . . . . . . . . . . . . . . <=====> . 09a0t39A 5 1957 2011 55

. . . . . . . . . . . . . . . . . . <=====> . 09a0t39B 6 1951 2011 61

. . . . . . . . . . . . . . . . . . <=======> . 09a0t67B 7 1933 2011 79

. . . . . . . . . . . . . . . . . . <=======> . 14a0221A 8 1936 2011 76

. . . . . . . . . . . . . . . . . . <========> . 14a0235A 9 1929 2011 83

. . . . . . . . . . . . . . . . . . <========> . 14a0235B 10 1929 2011 83

. . . . . . . . . . . . . . . . . .<=========> . 14a0t27A 11 1913 2011 99

. . . . . . . . . . . . . . . . . .<=========> . 14a0t27B 12 1913 2011 99

. . . . . . . . . . . . . . . . . . <======> . 15a0387A 13 1942 2011 70

. . . . . . . . . . . . . . . . . . <=======> . 15a0387B 14 1934 2011 78

. . . . . . . . . . . . . . . . . . <=======> . 15a0t44A 15 1936 2011 76

. . . . . . . . . . . . . . . . . . <=====> . 15a0t44B 16 1956 2011 56

. . . . . . . . . . . . . . . . . . <========> . 15a0t49A 17 1923 2011 89

. . . . . . . . . . . . . . . . . . <========> . 15a0t49B 18 1923 2011 89

. . . . . . . . . . . . . . . . . . .<====> . 22a0t59A 19 1963 2011 49

. . . . . . . . . . . . . . . . . . .<====> . 22a0t59B 20 1963 2011 49

. . . . . . . . . . . . . . . . . . <=====> . 22at110A 21 1957 2011 55

. . . . . . . . . . . . . . . . . . <=====> . 22at110B 22 1957 2011 55

. . . . . . . . . . . . . . . . . . <=====> . 22at143A 23 1957 2011 55

. . . . . . . . . . . . . . . . . . <=====> . 22at143B 24 1955 2011 57

. . . . . . . . . . . . . . . . . . .<====> . 23a0t93A 25 1962 2011 50

. . . . . . . . . . . . . . . . . . .<====> . 23a0t93B 26 1962 2011 50

. . . . . . . . . . . . . . . . . . <=====> . 23at170A 27 1953 2011 59

. . . . . . . . . . . . . . . . . . <=====> . 23at170B 28 1953 2011 59

. . . . . . . . . . . . . . . . . . <=====> . 23at191A 29 1958 2011 54

. . . . . . . . . . . . . . . . . . <=====> . 23at191B 30 1958 2011 54

. . . . . . . . . . . . . . . . . . <=====> . 27a0243A 31 1959 2011 53

. . . . . . . . . . . . . . . . . . <=====> . 27a0243B 32 1959 2011 53

. . . . . . . . . . . . . . . . . . <=====> . 27a0257A 33 1958 2011 54

. . . . . . . . . . . . . . . . . . <=====> . 27a0257B 34 1958 2011 54

. . . . . . . . . . . . . . . . . <===========> . 27a0324A 35 1894 2011 118

. . . . . . . . . . . . . . . . . <===========> . 27a0324B 36 1894 2011 118

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

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: 00:00 ®¯® 00 0000 Page 3

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

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 1.618 4 1950 0.251 17 2000 -0.180 36 1<<

1901 0.359 4 1951 0.629 18 2001 0.710 36

1902 -1.484 4 1952 1.015 18 2002 -0.898 36

1903 -0.648 4 1953 0.100 20 2003 -0.624 36

1904 -0.702 4 1954 0.786 20 2004 1.185 36

1905 -0.603 4 1955 0.606 21 2005 0.735 36

1906 0.193 4 1956 -2.844 22 2006 -0.474 36

1907 0.147 4 1957 1.064 26 2007 1.519 36

1908 -0.329 4 1958 0.188 30 2008 -0.937 36

1909 -0.891 4 1959 0.225 32 2009 0.195 36

1910 -0.268 4 1960 -0.780 32 2010 0.239 36

1911 -2.754 4 1961 1.308 32 2011 -0.042 36

1912 0.321 4 1962 -0.099 34

1913 -0.827 6 1963 0.645 36

1914 -0.656 6 1964 1.902 36

1915 -2.246 6 1965 0.663 36

1916 1.120 6 1966 -0.624 36

1917 0.311 6 1967 -1.293 36 1

1918 -0.730 6 1968 -0.035 36

1919 -0.492 6 1969 -0.644 36

1920 0.122 6 1970 -0.228 36

1921 2.281 6 1971 0.133 36

1922 -0.178 6 1972 1.378 36

1923 -0.419 8 1973 0.307 36

1924 2.127 8 1974 -1.273 36

1925 -0.167 8 1975 -0.840 36

1926 -0.193 8 1976 0.111 36

1927 0.633 8 1977 -0.845 36

1928 -0.261 8 1978 -1.977 36

1929 -0.342 10 1979 -1.636 36

1930 0.712 10 1980 1.517 36

1931 0.311 10 1981 -0.780 36

1932 0.497 10 1982 -0.660 36

1933 0.637 11 1983 0.548 36

1934 0.312 12 1984 -0.577 36

1935 0.107 12 1985 0.643 36

1936 -0.037 14 1986 0.375 36

1937 -0.140 14 1987 1.298 36

1938 0.327 14 1988 0.970 36

1939 0.554 16 1989 1.130 36

1940 -1.867 16 1990 1.119 36

1941 1.038 16 1991 -0.307 36

1942 -0.072 17 1992 0.380 36

1943 0.333 17 1993 0.904 36

1894 -2.237 2 1944 -0.436 17 1994 -0.651 36

1895 -0.079 2 1945 0.371 17 1995 0.128 36

1896 0.034 2 1946 0.523 17 1996 -0.842 36

1897 0.725 2 1947 -1.573 17 1997 -0.756 36

1898 1.363 4 1948 -2.299 17 1998 -1.564 36

1899 2.483 4 1949 0.943 17 1999 -0.064 36 1<<

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

PART 4: Master Bar Plot: 00:00 ®¯® 00 0000 Page 4

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

Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

1900----------F 1950------A 2000----a

1901-------A 1951--------C 2001--------C

1902f 1952---------D 2002-d

1903--c 1953-----@ 2003--b

1904--c 1954--------C 2004---------E

1905--b 1955--------B 2005--------C

1906-----A 1956k 2006---b

1907-----A 1957---------D 2007----------F

1908---a 1958-----A 2008-d

1909-d 1959------A 2009-----A

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

1911k 1961---------E 2011----@

1912------A 1962----@

1913-c 1963--------C

1914--c 1964----------H

1915i 1965--------C

1916---------D 1966--b

1917------A 1967-e

1918--c 1968----@

1919---b 1969--c

1920-----@ 1970----a

1921----------I 1971-----A

1922----a 1972----------F

1923---b 1973------A

1924----------I 1974-e

1925----a 1975-c

1926----a 1976-----@

1927--------C 1977-c

1928---a 1978h

1929---a 1979g

1930--------C 1980----------F

1931------A 1981-c

1932-------B 1982--c

1933--------C 1983--------B

1934------A 1984--b

1935-----@ 1985--------C

1936----@ 1986-------B

1937----a 1987---------E

1938------A 1988---------D

1939--------B 1989---------E

1940g 1990---------D

1941---------D 1991---a

1942----@ 1992-------B

1943------A 1993---------D

1894i 1944---b 1994--c

1895----@ 1945-------A 1995-----A

1896-----@ 1946--------B 1996-c

1897--------C 1947f 1997-c

1898----------E 1948i 1998f

1899----------J 1949---------D 1999----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: 00:00 ®¯® 00 0000 Page 5

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

Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under 0.3281 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 05a0211A 1939 2011 .55 .65 .43

2 05a0211B 1939 2011 .68 .62 .41

3 05a0t31A 1898 2011 .17B .20B .40 .45 .39

4 05a0t31B 1898 2011 .22A .21B .34B .67 .60

5 09a0t39A 1957 2011 .15A .27A

6 09a0t39B 1951 2011 .39 .35

7 09a0t67B 1933 2011 .35 .42 .16B

8 14a0221A 1936 2011 .50 .60 .51

9 14a0235A 1929 2011 .52 .55 .45

10 14a0235B 1929 2011 .52 .55 .51

11 14a0t27A 1913 2011 .39 .30A .29A .25A

12 14a0t27B 1913 2011 .39 .33 .40B .04B

13 15a0387A 1942 2011 .64 .58 .30A

14 15a0387B 1934 2011 .48 .45 .26A

15 15a0t44A 1936 2011 .43 .52 .27A

16 15a0t44B 1956 2011 .45 .51

17 15a0t49A 1923 2011 .52 .53 .59 .32A

18 15a0t49B 1923 2011 .34 .32A .30A .14A

19 22a0t59A 1963 2011 .60

20 22a0t59B 1963 2011 .50

21 22at110A 1957 2011 .37 .48

22 22at110B 1957 2011 .55 .58

23 22at143A 1957 2011 .49 .54

24 22at143B 1955 2011 .57 .60

25 23a0t93A 1962 2011 .42

26 23a0t93B 1962 2011 .41

27 23at170A 1953 2011 .32A .45

28 23at170B 1953 2011 .30A .49

29 23at191A 1958 2011 .25B .33A

30 23at191B 1958 2011 .36 .39

31 27a0243A 1959 2011 .51 .50

32 27a0243B 1959 2011 .55 .55

33 27a0257A 1958 2011 .56 .56

34 27a0257B 1958 2011 .48 .47

35 27a0324A 1894 2011 .18A .49 .60 .65 .44

36 27a0324B 1894 2011 .16B .40 .51 .66 .60

Av segment correlation 0.18 0.37 0.47 0.48 0.41

PART 6: POTENTIAL PROBLEMS: 00:00 ®¯® 00 0000 Page 5

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

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

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

05a0211A 1939 to 2011 73 years Series 1

[B] Entire series, effect on correlation ( 0.488) is:

Lower 1942<-0.040 1948>-0.038 1998>-0.030 1994>-0.017 1940>-0.016 1943<-0.015 Higher 1956 0.108 1981 0.019

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

05a0211B 1939 to 2011 73 years Series 2

[B] Entire series, effect on correlation ( 0.559) is:

Lower 1998>-0.042 1974>-0.020 1962<-0.016 1949<-0.014 2011<-0.014 2006>-0.013 Higher 1956 0.092 1981 0.018

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

05a0t31A 1898 to 2011 114 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

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

1898 1947 10 - - - - - - -.03 .20 -.10 -.34 .17| .06 -.04 -.09 .02 .05 -.07 .02 .14 .09 .22\*

1900 1949 8 - - - - .09 -.13 .07 .14 -.16 -.23 .20|-.10 -.05 -.10 -.01 .08 -.08 -.09 .32\*-.03 .20

[B] Entire series, effect on correlation ( 0.328) is:

Lower 1915>-0.028 1946<-0.018 1923>-0.014 1984>-0.013 1905<-0.012 1913>-0.010 Higher 1956 0.025 1981 0.017

1898 to 1947 segment:

Lower 1915>-0.058 1946<-0.048 1923>-0.031 1905<-0.030 1904>-0.021 1913>-0.020 Higher 1921 0.050 1911 0.039

1900 to 1949 segment:

Lower 1915>-0.059 1946<-0.043 1923>-0.029 1905<-0.028 1913>-0.021 1904>-0.020 Higher 1948 0.052 1921 0.048

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

05a0t31B 1898 to 2011 114 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

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

1898 1947 0 - - - - - - .21 -.16 -.11 -.10 .22\* .06 -.07 .16 -.05 .11 -.21 .03 -.03 .18 -.17

1900 1949 -4 - - - - .18 -.27 .31\*-.18 -.14 -.12 .21| .00 -.08 .17 -.03 .13 -.19 -.02 .00 .15 -.17

1925 1974 -6 .01 .03 -.06 .08 .34\*-.29 .18 .04 -.15 -.18 .34|-.01 -.06 -.01 -.03 .22 -.19 .02 .05 .03 -.04

[B] Entire series, effect on correlation ( 0.411) is:

Lower 1935<-0.069 1946<-0.023 1919<-0.019 1915>-0.018 2006>-0.016 1906<-0.014 Higher 1911 0.020 1956 0.019

1898 to 1947 segment:

Lower 1935<-0.083 1946<-0.033 1915>-0.031 1919<-0.027 1906<-0.021 1934>-0.019 Higher 1911 0.050 1921 0.034

1900 to 1949 segment:

Lower 1935<-0.086 1946<-0.035 1915>-0.032 1919<-0.028 1906<-0.021 1934>-0.018 Higher 1911 0.049 1921 0.038

1925 to 1974 segment:

Lower 1935<-0.135 1946<-0.046 1934>-0.018 1972<-0.014 1925>-0.013 1928>-0.010 Higher 1956 0.050 1957 0.030

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

09a0t39A 1957 to 2011 55 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

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

1957 2006 0 -.03 .00 -.36 .02 -.12 .01 .09 .15 -.04 -.02 .15\*-.19 -.10 .10 -.16 -.12 - - - - -

1962 2011 0 .13 -.06 -.31 .00 -.06 .05 -.10 -.01 .19 -.13 .27\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.247) is:

Lower 2001<-0.034 2002>-0.033 1959<-0.033 1977>-0.031 2006>-0.026 1981>-0.021 Higher 2008 0.068 1964 0.032

1957 to 2006 segment:

Lower 2001<-0.038 2002>-0.034 1959<-0.034 1977>-0.032 2006>-0.026 1983<-0.023 Higher 1994 0.050 1964 0.042

1962 to 2011 segment:

Lower 2001<-0.044 2002>-0.037 1977>-0.034 2006>-0.028 1983<-0.026 1981>-0.022 Higher 2008 0.076 1964 0.037

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

09a0t39B 1951 to 2011 61 years Series 6

[B] Entire series, effect on correlation ( 0.366) is:

Lower 1986<-0.031 1981>-0.026 2003>-0.024 2002>-0.019 1982>-0.013 1995<-0.012 Higher 2008 0.031 1964 0.026

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

2003 +3.5 SD

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

09a0t67B 1933 to 2011 79 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

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

1962 2011 -7 .13 .07 .05 .17\* .17 -.08 -.03 -.14 .10 -.01 .16| - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.268) is:

Lower 2004<-0.047 1945<-0.039 1948>-0.015 1985<-0.013 1995<-0.012 2006>-0.012 Higher 1956 0.085 2008 0.024

1962 to 2011 segment:

Lower 2004<-0.103 1985<-0.028 1995<-0.025 2006>-0.023 2002>-0.018 1969>-0.016 Higher 2008 0.068 1978 0.042

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

14a0221A 1936 to 2011 76 years Series 8

[B] Entire series, effect on correlation ( 0.497) is:

Lower 1936<-0.045 1984>-0.018 1937>-0.016 1998>-0.015 2006>-0.015 1940>-0.013 Higher 1956 0.025 1964 0.019

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

14a0235A 1929 to 2011 83 years Series 9

[B] Entire series, effect on correlation ( 0.477) is:

Lower 1931<-0.106 1984>-0.018 1936>-0.012 1967>-0.012 1991>-0.012 2002>-0.010 Higher 1940 0.038 1964 0.023

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

14a0235B 1929 to 2011 83 years Series 10

[B] Entire series, effect on correlation ( 0.506) is:

Lower 1948>-0.028 1936>-0.015 1981>-0.015 1998>-0.013 1967>-0.013 2001<-0.012 Higher 1940 0.027 1964 0.022

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

14a0t27A 1913 to 2011 99 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

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

1925 1974 0 -.07 -.09 -.05 .11 .16 -.17 .03 .18 -.02 -.37 .30\*-.02 .02 .03 -.02 -.17 .11 -.13 -.10 .11 .00

1950 1999 0 -.12 -.06 -.19 .00 .10 -.14 .06 .19 .02 -.02 .29\* .17 .15 -.14 -.11 .13 .04 -.06 -.16 .06 -.29

1962 2011 0 .00 -.14 -.22 .00 .15 -.01 .01 .05 .24 .00 .25\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.332) is:

Lower 1972<-0.030 1940>-0.029 1956>-0.026 1984>-0.014 1922>-0.014 2006>-0.013 Higher 1921 0.023 1957 0.016

1925 to 1974 segment:

Lower 1940>-0.057 1956>-0.056 1972<-0.054 1974>-0.009 1944<-0.006 1930<-0.005 Higher 1957 0.031 1941 0.026

1950 to 1999 segment:

Lower 1972<-0.057 1956>-0.048 1984>-0.027 1980<-0.021 1976<-0.020 1994>-0.015 Higher 1957 0.032 1964 0.026

1962 to 2011 segment:

Lower 1972<-0.064 1984>-0.034 2006>-0.031 1980<-0.023 1976<-0.021 1994>-0.019 Higher 1964 0.033 1967 0.032

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

1967 -1.293 36 1

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

14a0t27B 1913 to 2011 99 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

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

1950 1999 -9 .01 .44\*-.03 -.10 -.06 -.15 -.17 .01 -.11 -.29 .40| .14 .08 -.02 .12 .07 .02 -.16 -.05 -.08 -.02

1962 2011 -9 .14 .31\*-.15 .01 -.04 -.06 -.08 -.16 -.07 -.18 .04| - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.262) is:

Lower 1937<-0.040 1965<-0.032 2007<-0.019 1928<-0.017 1918>-0.012 2004<-0.012 Higher 1956 0.094 1924 0.020

1950 to 1999 segment:

Lower 1965<-0.114 1984>-0.024 1980<-0.021 1998>-0.017 1996>-0.016 1982>-0.016 Higher 1956 0.197 1978 0.031

1962 to 2011 segment:

Lower 1965<-0.044 2007<-0.043 2004<-0.027 1984>-0.022 2008>-0.018 1998>-0.013 Higher 1978 0.063 1981 0.027

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

15a0387A 1942 to 2011 70 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

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

1962 2011 0 -.06 -.07 .19 .09 .03 .03 -.01 -.10 -.03 -.04 .30\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.554) is:

Lower 1996>-0.022 1991>-0.020 1983<-0.013 1973>-0.013 2001<-0.012 1989<-0.012 Higher 1956 0.146 1947 0.020

1962 to 2011 segment:

Lower 1996>-0.033 1991>-0.031 1983<-0.021 2001<-0.019 1989<-0.018 1973>-0.017 Higher 1980 0.040 1974 0.038

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

15a0387B 1934 to 2011 78 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

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

1962 2011 0 -.21 -.23 -.12 .09 .06 -.18 .01 -.09 .10 -.04 .26\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.395) is:

Lower 1992<-0.057 1978>-0.021 1948>-0.020 1935>-0.019 1977>-0.016 2006>-0.015 Higher 1956 0.107 1940 0.045

1962 to 2011 segment:

Lower 1992<-0.090 1978>-0.034 1977>-0.026 2006>-0.025 1991>-0.017 1973<-0.016 Higher 1980 0.031 1996 0.029

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

15a0t44A 1936 to 2011 76 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

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

1962 2011 0 -.03 -.29 -.16 -.13 -.14 -.12 .23 .02 .09 .03 .27\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.400) is:

Lower 1999<-0.040 1940>-0.039 1970<-0.031 1981>-0.023 1984>-0.014 1980<-0.013 Higher 1956 0.116 1947 0.032

1962 to 2011 segment:

Lower 1999<-0.062 1981>-0.040 1970<-0.039 1984>-0.025 1980<-0.017 1983<-0.015 Higher 2004 0.024 1978 0.024

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

1999 -0.064 36 1 >> WARNING: Ring is not usually narrow

2000 -0.180 36 1 >> WARNING: Ring is not usually narrow

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

15a0t44B 1956 to 2011 56 years Series 16

[B] Entire series, effect on correlation ( 0.466) is:

Lower 1956>-0.082 2001<-0.029 1996>-0.018 1971<-0.013 1999<-0.011 1983<-0.011 Higher 1957 0.024 1978 0.023

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

15a0t49A 1923 to 2011 89 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

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

1962 2011 0 -.13 -.14 -.22 -.03 -.14 -.33 .03 .08 .02 -.09 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.462) is:

Lower 1938<-0.032 1931>-0.020 1923<-0.020 1981>-0.019 1971<-0.013 1937>-0.013 Higher 1956 0.110 1940 0.040

1962 to 2011 segment:

Lower 1981>-0.043 1971<-0.034 2006>-0.029 1993<-0.024 2010<-0.019 2002>-0.016 Higher 2007 0.026 1987 0.023

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

15a0t49B 1923 to 2011 89 years Series 18

[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 .13 .03 -.12 .26 -.23 -.22 .27 -.10 -.06 .09 .32\*-.34 .07 -.15 .16 .03 -.16 .01 .27 .05 .10

1950 1999 0 -.04 .14 -.08 .06 -.17 -.30 .19 -.19 -.11 -.03 .30\*-.26 -.06 .07 .23 .08 .08 .22 .09 -.07 -.08

1962 2011 0 -.08 .01 -.05 .06 -.22 -.30 .05 -.11 -.07 -.05 .14\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.258) is:

Lower 1990<-0.030 1984>-0.025 1932<-0.023 1938<-0.022 1931>-0.020 2010<-0.016 Higher 1956 0.032 1940 0.026

1925 to 1974 segment:

Lower 1938<-0.042 1932<-0.042 1931>-0.034 1963<-0.025 1928>-0.017 1966>-0.011 Higher 1956 0.039 1940 0.038

1950 to 1999 segment:

Lower 1990<-0.058 1984>-0.047 1963<-0.027 1996>-0.022 1981>-0.020 1989<-0.012 Higher 1956 0.054 1978 0.030

1962 to 2011 segment:

Lower 1990<-0.054 1984>-0.050 2006>-0.026 1996>-0.025 1963<-0.025 2010<-0.025 Higher 1978 0.040 1969 0.033

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

22a0t59A 1963 to 2011 49 years Series 19

[B] Entire series, effect on correlation ( 0.602) is:

Lower 1984>-0.038 2006<-0.024 1969>-0.023 2009<-0.012 1968<-0.011 1978>-0.009 Higher 1981 0.019 1980 0.012

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

22a0t59B 1963 to 2011 49 years Series 20

[B] Entire series, effect on correlation ( 0.496) is:

Lower 1984>-0.031 1988<-0.028 1969>-0.026 1997<-0.020 1979>-0.016 1964<-0.013 Higher 1978 0.043 1981 0.028

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

22at110A 1957 to 2011 55 years Series 21

[B] Entire series, effect on correlation ( 0.404) is:

Lower 2005<-0.051 1960>-0.041 1957<-0.037 1979>-0.029 2006>-0.020 1984>-0.016 Higher 2007 0.032 1996 0.030

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

22at110B 1957 to 2011 55 years Series 22

[B] Entire series, effect on correlation ( 0.558) is:

Lower 2003<-0.029 1999<-0.027 1960>-0.019 2006>-0.016 1998>-0.015 1975>-0.015 Higher 1981 0.032 1978 0.028

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

22at143A 1957 to 2011 55 years Series 23

[B] Entire series, effect on correlation ( 0.524) is:

Lower 1962>-0.033 1996>-0.026 1974>-0.025 1988<-0.022 1973>-0.014 1997>-0.013 Higher 2008 0.025 1972 0.018

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

22at143B 1955 to 2011 57 years Series 24

[B] Entire series, effect on correlation ( 0.599) is:

Lower 1982<-0.098 1957<-0.012 1962>-0.011 1983<-0.009 2005<-0.009 1977>-0.009 Higher 2008 0.020 1956 0.015

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

23a0t93A 1962 to 2011 50 years Series 25

[B] Entire series, effect on correlation ( 0.415) is:

Lower 1964<-0.034 2004<-0.030 1969>-0.030 2009<-0.028 1994>-0.017 1962>-0.014 Higher 1980 0.024 2007 0.022

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

23a0t93B 1962 to 2011 50 years Series 26

[B] Entire series, effect on correlation ( 0.406) is:

Lower 1996>-0.037 2006>-0.031 2004<-0.030 1994>-0.024 1998>-0.023 1986<-0.014 Higher 2007 0.033 1987 0.026

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

23at170A 1953 to 2011 59 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

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

1953 2002 0 .08 .12 .04 .13 .11 .08 -.17 -.10 -.10 -.04 .32\*-.22 -.03 .12 -.04 -.06 -.14 .18 -.06 -.21 -

[B] Entire series, effect on correlation ( 0.336) is:

Lower 1956>-0.091 1960>-0.019 1996>-0.016 2006>-0.014 1994>-0.014 1981>-0.014 Higher 2007 0.026 1998 0.026

1953 to 2002 segment:

Lower 1956>-0.106 1960>-0.022 1996>-0.018 1981>-0.016 1994>-0.016 1987<-0.013 Higher 1998 0.030 1980 0.028

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

23at170B 1953 to 2011 59 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

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

1953 2002 0 -.02 .08 -.08 .15 .13 .16 -.11 -.03 -.03 .02 .30\*-.24 .06 .05 .01 -.10 -.25 .17 .00 -.24 -

[B] Entire series, effect on correlation ( 0.346) is:

Lower 1956>-0.105 1981>-0.036 1996>-0.022 1960>-0.012 1978>-0.011 1977>-0.009 Higher 1998 0.022 1974 0.017

1953 to 2002 segment:

Lower 1956>-0.116 1981>-0.039 1996>-0.025 1960>-0.013 1978>-0.012 1977>-0.010 Higher 1998 0.032 1974 0.019

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

23at191A 1958 to 2011 54 years Series 29

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

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

1958 2007 -10 .26\*-.23 .11 .10 -.03 -.02 .14 .07 -.21 .12 .25|-.30 -.15 .00 .07 - - - - - -

1962 2011 0 .29 -.25 .07 -.02 .01 .04 .05 .16 -.15 -.01 .33\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.314) is:

Lower 1970<-0.058 1978>-0.034 1963<-0.026 1987<-0.019 1985<-0.017 1977>-0.014 Higher 2008 0.060 1980 0.031

1958 to 2007 segment:

Lower 1970<-0.059 1978>-0.033 1963<-0.028 1987<-0.021 1985<-0.019 1977>-0.015 Higher 1980 0.038 1984 0.031

1962 to 2011 segment:

Lower 1970<-0.062 1978>-0.039 1963<-0.027 1987<-0.020 1985<-0.017 1977>-0.016 Higher 2008 0.061 1980 0.034

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

23at191B 1958 to 2011 54 years Series 30

[B] Entire series, effect on correlation ( 0.349) is:

Lower 1962<-0.051 2007<-0.033 1996>-0.025 1988<-0.020 1964<-0.019 1960>-0.017 Higher 2004 0.026 1972 0.026

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

27a0243A 1959 to 2011 53 years Series 31

[B] Entire series, effect on correlation ( 0.507) is:

Lower 1998>-0.030 1979>-0.028 1996>-0.024 1970>-0.021 2006>-0.018 1995<-0.016 Higher 1981 0.034 1980 0.024

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

27a0243B 1959 to 2011 53 years Series 32

[B] Entire series, effect on correlation ( 0.538) is:

Lower 1974>-0.035 1969<-0.022 1991>-0.018 2006>-0.016 1979>-0.016 1960>-0.014 Higher 1981 0.037 1964 0.024

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

27a0257A 1958 to 2011 54 years Series 33

[B] Entire series, effect on correlation ( 0.545) is:

Lower 1991>-0.043 2006<-0.025 1962>-0.018 1979>-0.016 1984>-0.016 1992<-0.014 Higher 1978 0.035 1981 0.019

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

27a0257B 1958 to 2011 54 years Series 34

[B] Entire series, effect on correlation ( 0.473) is:

Lower 1974>-0.042 1978>-0.024 1975<-0.019 1971<-0.015 1979>-0.012 1958<-0.012 Higher 1980 0.036 1964 0.026

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

27a0324A 1894 to 2011 118 years Series 35

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

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

1894 1943 0 - - - - - - - - - - .18\*-.15 -.04 -.02 .10 -.17 .11 -.09 .08 .04 .04

[B] Entire series, effect on correlation ( 0.358) is:

Lower 1894>-0.177 1935>-0.017 1896<-0.012 1991>-0.011 1904<-0.008 1985<-0.008 Higher 1956 0.082 1911 0.017

1894 to 1943 segment:

Lower 1894>-0.274 1935>-0.028 1896<-0.023 1904<-0.016 1903<-0.015 1934<-0.015 Higher 1911 0.045 1924 0.039

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

1894 +4.6 SD

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

27a0324B 1894 to 2011 118 years Series 36

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

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

1894 1943 8 - - - - - - - - - - .16|-.09 .05 -.08 -.11 -.33 -.06 -.02 .20\* .03 -.03

[B] Entire series, effect on correlation ( 0.397) is:

Lower 1894<-0.121 1939<-0.016 1896>-0.015 1930<-0.011 1901>-0.009 1916<-0.009 Higher 1956 0.066 1940 0.014

1894 to 1943 segment:

Lower 1894<-0.243 1939<-0.029 1896>-0.027 1930<-0.020 1901>-0.016 1935>-0.011 Higher 1940 0.048 1911 0.045

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

1894 -4.6 SD

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

PART 7: DESCRIPTIVE STATISTICS: 00:00 ®¯® 00 0000 Page 6

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

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 05a0211A 1939 2011 73 3 0 0.488 1.19 1.98 0.425 0.718 0.221 2.62 0.536 0.041 1

2 05a0211B 1939 2011 73 3 0 0.559 0.96 1.98 0.325 0.558 0.236 2.82 0.549 -0.023 3

3 05a0t31A 1898 2011 114 5 2 0.328 0.83 2.58 0.479 0.887 0.191 2.82 0.578 -0.041 1

4 05a0t31B 1898 2011 114 5 3 0.411 0.91 2.45 0.471 0.865 0.184 2.52 0.370 -0.076 1

5 09a0t39A 1957 2011 55 2 2 0.247 1.44 2.48 0.431 0.745 0.161 2.78 0.582 -0.030 3

6 09a0t39B 1951 2011 61 2 0 0.366 1.48 2.58 0.536 0.669 0.246 2.95 0.563 -0.014 1

7 09a0t67B 1933 2011 79 3 1 0.268 1.27 2.05 0.334 0.640 0.169 2.60 0.447 -0.045 1

8 14a0221A 1936 2011 76 3 0 0.497 1.34 3.19 0.956 0.951 0.237 2.66 0.473 -0.103 1

9 14a0235A 1929 2011 83 3 0 0.477 1.21 3.01 0.748 0.903 0.254 2.78 0.421 -0.001 1

10 14a0235B 1929 2011 83 3 0 0.506 1.14 3.01 0.702 0.892 0.257 2.75 0.396 -0.042 1

11 14a0t27A 1913 2011 99 4 3 0.332 0.83 2.34 0.611 0.944 0.278 2.53 0.397 -0.034 1

12 14a0t27B 1913 2011 99 4 2 0.262 0.85 2.92 0.668 0.948 0.236 2.69 0.440 0.007 1

13 15a0387A 1942 2011 70 3 1 0.554 2.49 4.79 1.067 0.838 0.186 2.49 0.412 -0.028 1

14 15a0387B 1934 2011 78 3 1 0.395 2.27 4.53 1.198 0.883 0.197 2.74 0.552 -0.046 1

15 15a0t44A 1936 2011 76 3 1 0.400 2.00 4.68 1.134 0.894 0.257 2.69 0.567 0.095 1

16 15a0t44B 1956 2011 56 2 0 0.466 1.91 4.47 1.147 0.922 0.185 2.62 0.510 0.014 1

17 15a0t49A 1923 2011 89 4 1 0.462 1.78 3.21 0.608 0.817 0.169 2.55 0.483 -0.051 1

18 15a0t49B 1923 2011 89 4 3 0.258 1.75 4.55 0.729 0.777 0.201 2.76 0.597 0.079 1

19 22a0t59A 1963 2011 49 1 0 0.602 1.90 3.07 0.488 0.696 0.147 2.45 0.496 -0.084 1

20 22a0t59B 1963 2011 49 1 0 0.496 1.67 2.49 0.311 0.339 0.174 2.57 0.575 0.026 1

21 22at110A 1957 2011 55 2 0 0.404 1.63 3.75 0.593 0.771 0.165 2.79 0.587 0.033 1

22 22at110B 1957 2011 55 2 0 0.558 1.66 2.39 0.337 0.703 0.132 2.55 0.515 -0.033 1

23 22at143A 1957 2011 55 2 0 0.524 1.18 2.30 0.469 0.842 0.199 2.71 0.603 -0.072 2

24 22at143B 1955 2011 57 2 0 0.599 1.41 2.26 0.505 0.831 0.184 2.42 0.484 -0.033 2

25 23a0t93A 1962 2011 50 1 0 0.415 2.62 4.30 0.568 0.781 0.118 2.56 0.480 -0.063 1

26 23a0t93B 1962 2011 50 1 0 0.406 2.65 4.20 0.571 0.726 0.119 2.73 0.514 0.063 1

27 23at170A 1953 2011 59 2 1 0.336 2.03 4.42 0.935 0.871 0.201 2.61 0.522 -0.079 1

28 23at170B 1953 2011 59 2 1 0.346 2.19 4.38 0.753 0.791 0.195 2.39 0.499 -0.058 1

29 23at191A 1958 2011 54 2 2 0.314 1.99 4.58 0.847 0.918 0.139 2.57 0.527 -0.090 1

30 23at191B 1958 2011 54 2 0 0.349 1.88 4.24 0.818 0.837 0.185 2.52 0.412 -0.001 1

31 27a0243A 1959 2011 53 2 0 0.507 1.95 3.40 0.543 0.783 0.129 2.66 0.473 -0.017 1

32 27a0243B 1959 2011 53 2 0 0.538 2.03 2.93 0.396 0.688 0.118 2.70 0.545 0.077 1

33 27a0257A 1958 2011 54 2 0 0.545 2.26 3.45 0.517 0.738 0.133 2.51 0.485 -0.050 1

34 27a0257B 1958 2011 54 2 0 0.473 1.88 3.01 0.396 0.712 0.128 2.77 0.507 -0.043 1

35 27a0324A 1894 2011 118 5 1 0.358 1.24 2.22 0.409 0.737 0.200 2.61 0.361 -0.006 1

36 27a0324B 1894 2011 118 5 1 0.397 0.96 2.10 0.462 0.892 0.200 2.56 0.405 -0.085 1

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

Total or mean: 2563 97 26 0.418 1.53 4.79 0.623 0.806 0.194 2.95 0.487 -0.024

- = [ COFECHA BFMIDCOF ] = -