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

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

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: Sprucehightest.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 1828 to 2011 184 years

Continuous time span is 1828 to 2011 184 years

Portion with two or more series is 1828 to 2011 184 years

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

\*C\* Number of dated series 27 \*C\*

\*O\* Master series 1828 2011 184 yrs \*O\*

\*F\* Total rings in all series 3422 \*F\*

\*E\* Total dated rings checked 3422 \*E\*

\*C\* Series intercorrelation 0.552 \*C\*

\*H\* Average mean sensitivity 0.252 \*H\*

\*A\* Segments, possible problems 20 \*A\*

\*\*\* Mean length of series 126.7 \*\*\*

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

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: 00:00 ®¯® 00 0000 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

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

. . . . . . . . . . . . . . . . <==================> . 13p02831 1 1828 2011 184

. . . . . . . . . . . . . . . . <==================> . 13p02832 2 1828 2011 184

. . . . . . . . . . . . . . . . . <============> . 14p02481 3 1885 2011 127

. . . . . . . . . . . . . . . . . <============> . 14p02482 4 1885 2011 127

. . . . . . . . . . . . . . . . . .<=========> . 21p02721 5 1913 2011 99

. . . . . . . . . . . . . . . . . .<=========> . 21p02722 6 1913 2011 99

. . . . . . . . . . . . . . . . . <==========> . 22p0t221 7 1907 2011 105

. . . . . . . . . . . . . . . . . <==========> . 22p0t441 8 1903 2011 109

. . . . . . . . . . . . . . . . . <==========> . 22p0t442 9 1902 2011 110

. . . . . . . . . . . . . . . . . . <========> . 22p0t481 10 1922 2011 90

. . . . . . . . . . . . . . . . . <=============> . 22p0t482 11 1871 2011 141

. . . . . . . . . . . . . . . . <===============> . 24p04172 12 1858 2011 154

. . . . . . . . . . . . . . . . .<==============> . 24p04171 13 1860 2011 152

. . . . . . . . . . . . . . . . . <=============> . 24p03602 14 1872 2011 140

. . . . . . . . . . . . . . . . . <=============> . 24p03601 15 1872 2011 140

. . . . . . . . . . . . . . . . . . <======> . 24p0t961 16 1943 2011 69

. . . . . . . . . . . . . . . . . . <======> . 24p0t962 17 1943 2011 69

. . . . . . . . . . . . . . . . . <=============> . 25p02981 18 1873 2011 139

. . . . . . . . . . . . . . . . . <=============> . 25p02982 19 1873 2011 139

. . . . . . . . . . . . . . . . .<==============> . 26p02631 20 1869 2011 143

. . . . . . . . . . . . . . . . . <============> . 26p02801 21 1887 2011 125

. . . . . . . . . . . . . . . . .<==============> . 26p02632 22 1869 2011 143

. . . . . . . . . . . . . . . . . <============> . 26p02802 23 1886 2011 126

. . . . . . . . . . . . . . . . . <===========> . 27p03292 24 1892 2011 120

. . . . . . . . . . . . . . . . . <===========> . 27p03291 25 1892 2011 120

. . . . . . . . . . . . . . . . . <=============> . 27p02912 26 1878 2011 134

. . . . . . . . . . . . . . . . . <=============> . 27p02911 27 1878 2011 134

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

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

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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

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

1850 0.621 2 1900 0.171 19 1950 -0.286 27 2000 -0.622 27

1851 -0.958 2 1901 0.417 19 1951 0.616 27 2001 1.399 27

1852 -2.897 2 1902 -0.330 20 1952 0.550 27 2002 1.155 27

1853 -1.955 2 1903 0.269 21 1953 -0.629 27 2003 -1.731 27

1854 -0.116 2 1904 1.175 21 1954 0.252 27 2004 -1.966 27

1855 -0.125 2 1905 0.359 21 1955 1.259 27 2005 -1.526 27

1856 1.383 2 1906 -0.417 21 1956 -2.748 27 2006 -0.942 27

1857 0.697 2 1907 -0.560 22 1957 -0.584 27 2007 0.732 27

1858 0.186 3 1908 -0.133 22 1958 0.491 27 2008 0.134 27

1859 -0.588 3 1909 -1.061 22 1959 -0.224 27 2009 0.575 27

1860 -0.963 4 1910 -0.648 22 1960 -1.002 27 2010 1.571 27

1861 -0.083 4 1911 -1.369 22 1961 1.418 27 2011 0.543 27

1862 1.416 4 1912 -0.474 22 1962 -0.067 27

1863 0.351 4 1913 0.278 24 1963 1.317 27

1864 -1.186 4 1914 0.860 24 1964 1.859 27

1865 -0.086 4 1915 0.907 24 1965 0.775 27

1866 0.522 4 1916 1.146 24 1966 -0.788 27

1867 0.322 4 1917 -0.326 24 1967 -0.174 27

1868 -0.038 4 1918 -2.029 24 1968 -0.476 27

1869 -0.668 6 1919 0.046 24 1969 -0.865 27

1870 0.538 6 1920 -0.085 24 1970 -0.237 27

1871 -0.015 7 1921 0.269 24 1971 0.959 27

1872 0.050 9 1922 0.424 25 1972 0.060 27

1873 0.180 11 1923 -0.120 25 1973 0.461 27

1874 0.553 11 1924 1.011 25 1974 -0.686 27

1875 0.969 11 1925 -1.364 25 1975 1.466 27

1876 0.383 11 1926 -0.264 25 1976 -0.112 27

1877 -0.967 11 1927 -0.471 25 1977 -0.475 27

1828 1.955 2 1878 -0.329 13 1928 -0.035 25 1978 0.209 27

1829 1.063 2 1879 0.386 13 1929 -0.144 25 1979 -0.244 27

1830 -0.049 2 1880 0.884 13 1930 -0.073 25 1980 0.986 27

1831 0.535 2 1881 -0.230 13 1931 1.274 25 1981 -1.405 27

1832 -0.455 2 1882 -1.820 13 1932 0.934 25 1982 -1.862 27

1833 0.645 2 1883 -1.054 13 1933 0.916 25 1983 -0.532 27

1834 1.717 2 1884 -0.654 13 1934 0.447 25 1984 -1.358 27

1835 -3.645 2 1885 -0.329 15 1935 -1.283 25 1985 -0.246 27

1836 -0.518 2 1886 0.735 16 1936 -0.646 25 1986 -0.695 27

1837 -1.405 2 1887 -0.075 17 1937 -0.220 25 1987 0.890 27

1838 -3.433 2 1888 0.262 17 1938 0.509 25 1988 1.272 27

1839 -0.145 2 1889 -0.139 17 1939 0.853 25 1989 0.112 27

1840 0.975 2 1890 0.165 17 1940 -1.060 25 1990 0.209 27

1841 0.487 2 1891 0.475 17 1941 1.470 25 1991 1.173 27

1842 1.786 2 1892 0.910 19 1942 0.419 25 1992 0.789 27

1843 0.768 2 1893 0.026 19 1943 -0.279 27 1993 0.735 27

1844 -0.198 2 1894 0.229 19 1944 -0.192 27 1994 -0.143 27

1845 1.930 2 1895 0.322 19 1945 0.196 27 1995 0.543 27

1846 2.308 2 1896 0.474 19 1946 -0.039 27 1996 -1.197 27

1847 -0.002 2 1897 -0.282 19 1947 0.055 27 1997 -0.073 27

1848 1.410 2 1898 -0.373 19 1948 -3.447 27 1998 -0.526 27

1849 -0.875 2 1899 -0.274 19 1949 0.515 27 1999 0.368 27

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

1850--------B 1900------A 1950---a 2000--b

1851-d 1901-------B 1951--------B 2001----------F

1852l 1902---a 1952-------B 2002---------E

1853h 1903------A 1953--c 2003g

1854----@ 1904---------E 1954------A 2004h

1855----@ 1905------A 1955----------E 2005f

1856----------F 1906--b 1956k 2006-d

1857--------C 1907--b 1957--b 2007--------C

1858------A 1908----a 1958-------B 2008-----A

1859--b 1909-d 1959---a 2009-------B

1860-d 1910--c 1960-d 2010----------F

1861----@ 1911-e 1961----------F 2011-------B

1862----------F 1912--b 1962----@

1863------A 1913------A 1963----------E

1864-e 1914---------C 1964----------G

1865----@ 1915---------D 1965--------C

1866-------B 1916---------E 1966-c

1867------A 1917---a 1967----a

1868-----@ 1918h 1968--b

1869--c 1919-----@ 1969-c

1870-------B 1920----@ 1970---a

1871-----@ 1921------A 1971---------D

1872-----@ 1922-------B 1972-----@

1873------A 1923----@ 1973-------B

1874-------B 1924---------D 1974--c

1875---------D 1925-e 1975----------F

1876-------B 1926---a 1976----@

1877-d 1927--b 1977--b

1828----------H 1878---a 1928-----@ 1978------A

1829---------D 1879-------B 1929----a 1979---a

1830----@ 1880---------D 1930----@ 1980---------D

1831-------B 1881---a 1931----------E 1981-f

1832--b 1882g 1932---------D 1982g

1833--------C 1883-d 1933---------D 1983--b

1834----------G 1884--c 1934-------B 1984-e

1835o 1885---a 1935-e 1985---a

1836--b 1886--------C 1936--c 1986--c

1837-f 1887----@ 1937---a 1987---------D

1838n 1888------A 1938-------B 1988----------E

1839----a 1889----a 1939--------C 1989-----@

1840---------D 1890------A 1940-d 1990------A

1841-------B 1891-------B 1941----------F 1991---------E

1842----------G 1892---------D 1942-------B 1992--------C

1843--------C 1893-----@ 1943---a 1993--------C

1844----a 1894------A 1944----a 1994----a

1845----------H 1895------A 1945------A 1995-------B

1846----------I 1896-------B 1946-----@ 1996-e

1847-----@ 1897---a 1947-----@ 1997----@

1848----------F 1898---a 1948n 1998--b

1849-d 1899---a 1949-------B 1999------A

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

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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 1825 1850 1875 1900 1925 1950 1975

1874 1899 1924 1949 1974 1999 2024

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

1 13p02831 1828 2011 .61 .36 .52 .39 .32A .50 .77

2 13p02832 1828 2011 .52 .15B .45 .70 .69 .74 .72

3 14p02481 1885 2011 .45 .60 .69 .68 .50

4 14p02482 1885 2011 .33 .57 .75 .64 .59

5 21p02721 1913 2011 .69 .73 .77 .74

6 21p02722 1913 2011 .69 .80 .68 .66

7 22p0t221 1907 2011 .39 .47 .47 .62

8 22p0t441 1903 2011 .41 .56 .47B .10A

9 22p0t442 1902 2011 .59 .71 .74 .65

10 22p0t481 1922 2011 .65 .64 .59 .58

11 22p0t482 1871 2011 -.07B .13B .54 .67 .58 .55

12 24p04172 1858 2011 .08B .34B .63 .74 .71 .68

13 24p04171 1860 2011 .24B .37 .52 .65 .73 .66

14 24p03602 1872 2011 .52 .54 .78 .84 .79 .84

15 24p03601 1872 2011 .54 .54 .66 .70 .63 .67

16 24p0t961 1943 2011 .49 .49 .41

17 24p0t962 1943 2011 .48 .38 .53

18 25p02981 1873 2011 .26B .27B .39 .61 .56 .48

19 25p02982 1873 2011 .11B .15B .48 .68 .57 .48

20 26p02631 1869 2011 -.13B-.09B .23B .66 .75 .58

21 26p02801 1887 2011 .22B .40 .58 .45 .41

22 26p02632 1869 2011 -.08B-.06B .26B .60 .72 .73

23 26p02802 1886 2011 .39 .48 .66 .69 .64

24 27p03292 1892 2011 .60 .74 .76 .62 .64

25 27p03291 1892 2011 .36 .55 .79 .79 .73

26 27p02912 1878 2011 .59 .66 .57 .44 .40

27 27p02911 1878 2011 .56 .81 .84 .80 .73

Av segment correlation 0.56 0.18 0.35 0.55 0.65 0.63 0.60

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

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

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

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

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

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

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

[D] Absent rings (zero values)

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

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

13p02831 1828 to 2011 184 years Series 1

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

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

1925 1974 0 .07 .01 .16 .14 -.13 -.29 -.06 .01 .05 -.16 .32\* .16 .04 -.01 -.05 -.09 -.03 -.13 .09 .04 .20

[B] Entire series, effect on correlation ( 0.547) is:

Lower 1956>-0.024 1940>-0.017 1874<-0.016 1847<-0.009 1868>-0.008 1855>-0.007 Higher 1835 0.069 2003 0.014

1925 to 1974 segment:

Lower 1940>-0.057 1956>-0.039 1964<-0.023 1953>-0.023 1959<-0.018 1932<-0.016 Higher 1948 0.112 1935 0.027

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

13p02832 1828 to 2011 184 years Series 2

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

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

1850 1899 -1 -.02 .07 .06 -.24 -.02 .22 .11 -.02 .03 .29\* .15|-.14 -.21 -.03 -.22 -.11 .05 .10 .11 -.05 -.31

[B] Entire series, effect on correlation ( 0.595) is:

Lower 1877>-0.025 1847>-0.014 1859>-0.013 1833<-0.008 1932<-0.008 1855<-0.007 Higher 1956 0.034 1948 0.024

1850 to 1899 segment:

Lower 1877>-0.126 1859>-0.065 1855<-0.034 1863>-0.025 1853<-0.016 1861<-0.013 Higher 1852 0.075 1882 0.046

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

1859 +3.0 SD; 1877 +3.3 SD

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

14p02481 1885 to 2011 127 years Series 3

[B] Entire series, effect on correlation ( 0.583) is:

Lower 1893<-0.024 1917>-0.022 2003>-0.014 1947<-0.013 1940>-0.010 1898>-0.009 Higher 1956 0.074 1918 0.020

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

14p02482 1885 to 2011 127 years Series 4

[B] Entire series, effect on correlation ( 0.571) is:

Lower 1900<-0.033 1960<-0.016 2003>-0.013 1981>-0.011 1917>-0.010 1911>-0.009 Higher 1956 0.034 1948 0.025

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

21p02721 1913 to 2011 99 years Series 5

[B] Entire series, effect on correlation ( 0.716) is:

Lower 1931<-0.025 2004>-0.010 1935>-0.010 1960>-0.010 1974>-0.009 2006>-0.009 Higher 1948 0.050 2003 0.018

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

21p02722 1913 to 2011 99 years Series 6

[B] Entire series, effect on correlation ( 0.683) is:

Lower 1918<-0.025 2010<-0.013 1977<-0.013 1987<-0.012 1923>-0.008 1939<-0.008 Higher 1948 0.040 2003 0.018

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

1918 -5.4 SD

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

22p0t221 1907 to 2011 105 years Series 7

[B] Entire series, effect on correlation ( 0.478) is:

Lower 1919<-0.032 1960>-0.015 2011<-0.013 1950<-0.012 2004>-0.012 1952<-0.011 Higher 2003 0.035 1981 0.021

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

22p0t441 1903 to 2011 109 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

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

1950 1999 3 .00 .04 -.05 -.30 .02 -.06 -.08 .03 -.07 .01 .47|-.05 -.23 .49\* .09 -.17 .18 .00 -.20 -.05 -.02

1962 2011 0 -.09 .10 -.24 -.16 .01 -.23 -.10 -.11 .08 .09 .10\* - - - - - - - - - -

[B] Entire series, effect on correlation ( 0.371) is:

Lower 1925>-0.033 2002<-0.029 1917>-0.017 1940>-0.015 1926<-0.012 1909>-0.011 Higher 1948 0.070 1956 0.058

1950 to 1999 segment:

Lower 1978<-0.029 1995<-0.025 1993<-0.018 1971<-0.017 1981>-0.015 1953<-0.014 Higher 1956 0.144 1964 0.023

1962 to 2011 segment:

Lower 2002<-0.071 2000>-0.026 2006>-0.022 1995<-0.021 1978<-0.021 1993<-0.016 Higher 2003 0.059 1964 0.049

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

22p0t442 1902 to 2011 110 years Series 9

[B] Entire series, effect on correlation ( 0.678) is:

Lower 1940>-0.018 1978<-0.015 1918>-0.015 1933<-0.014 1977>-0.012 1942<-0.008 Higher 1956 0.064 1948 0.028

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

22p0t481 1922 to 2011 90 years Series 10

[B] Entire series, effect on correlation ( 0.614) is:

Lower 2008<-0.014 1939<-0.013 1999<-0.012 2010<-0.012 1996>-0.011 1952<-0.010 Higher 1948 0.025 2003 0.022

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

22p0t482 1871 to 2011 141 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

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

1871 1920 -1 -.16 .18 .15 -.27 -.09 -.13 -.13 -.19 -.15 .40\*-.07|-.12 -.19 -.18 .14 .12 -.06 -.06 .06 .24 .10

1875 1924 -1 -.06 -.14 -.01 -.10 .09 -.15 -.38 -.24 -.12 .28\* .13|-.18 -.02 -.25 .04 -.14 .09 .07 .01 .02 -.13

[B] Entire series, effect on correlation ( 0.408) is:

Lower 1871>-0.060 1872<-0.040 1983<-0.014 1969>-0.009 1988<-0.008 1960>-0.008 Higher 1956 0.052 1925 0.022

1871 to 1920 segment:

Lower 1871>-0.137 1872<-0.034 1919<-0.016 1896<-0.016 1881>-0.014 1873<-0.013 Higher 1918 0.063 1882 0.052

1875 to 1924 segment:

Lower 1924<-0.033 1896<-0.029 1919<-0.029 1881>-0.028 1887>-0.027 1909>-0.019 Higher 1918 0.072 1882 0.059

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

1871 1872 -4.1 SD

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

1871 +6.0 SD

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

24p04172 1858 to 2011 154 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

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

1858 1907 1 -.05 .10 .05 -.01 -.02 .05 .30 .04 -.15 -.32 .08| .49\* .07 -.10 -.06 -.01 .07 -.14 -.03 -.17 -.10

1875 1924 1 .08 .22 .20 -.13 -.21 .07 .16 -.10 -.12 -.23 .34| .38\* .02 -.06 -.05 -.13 -.10 .10 .15 -.06 -.04

[B] Entire series, effect on correlation ( 0.526) is:

Lower 1881<-0.076 1860>-0.020 1858<-0.017 1934<-0.010 1935>-0.008 1904<-0.008 Higher 1956 0.053 1948 0.027

1858 to 1907 segment:

Lower 1860>-0.053 1858<-0.041 1881<-0.030 1904<-0.016 1878>-0.016 1866<-0.015 Higher 1862 0.020 1875 0.016

1875 to 1924 segment:

Lower 1881<-0.166 1904<-0.026 1878>-0.019 1916<-0.018 1882>-0.011 1877>-0.008 Higher 1917 0.034 1924 0.028

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

1859 1860 4.2 SD 1880 1881 -4.1 SD

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

1881 -5.3 SD

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

24p04171 1860 to 2011 152 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

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

1860 1909 1 -.16 -.16 .12 .08 -.10 .09 .18 .05 -.09 -.22 .24| .40\*-.18 -.08 .16 -.04 .06 -.22 .02 .06 -.10

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

Lower 1881<-0.034 1877>-0.016 1934<-0.015 1937<-0.014 1901<-0.009 1918>-0.008 Higher 1956 0.063 2003 0.015

1860 to 1909 segment:

Lower 1877>-0.057 1881<-0.032 1901<-0.026 1872>-0.014 1861>-0.013 1864>-0.013 Higher 1862 0.035 1886 0.023

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

1881 -4.6 SD

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

24p03602 1872 to 2011 140 years Series 14

[B] Entire series, effect on correlation ( 0.744) is:

Lower 1917<-0.020 1878>-0.012 1918>-0.007 1885<-0.007 1992<-0.006 1902>-0.004 Higher 1948 0.036 2003 0.012

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

24p03601 1872 to 2011 140 years Series 15

[B] Entire series, effect on correlation ( 0.633) is:

Lower 1960<-0.014 2003>-0.013 1938<-0.011 1877<-0.010 1946<-0.010 1990<-0.008 Higher 1948 0.039 1882 0.012

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

24p0t961 1943 to 2011 69 years Series 16

[B] Entire series, effect on correlation ( 0.445) is:

Lower 1962<-0.075 2004>-0.028 2007<-0.022 1969>-0.009 1989>-0.008 2005>-0.008 Higher 1948 0.035 1981 0.031

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

2004 +3.0 SD

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

24p0t962 1943 to 2011 69 years Series 17

[B] Entire series, effect on correlation ( 0.564) is:

Lower 1974<-0.035 1988<-0.031 1975<-0.024 1956>-0.023 1965<-0.014 1960>-0.010 Higher 1948 0.091 2003 0.036

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

25p02981 1873 to 2011 139 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

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

1873 1922 5 -.09 -.03 .00 -.09 .09 .24 .04 -.32 -.25 .15 .26|-.08 -.13 .03 .06 .31\*-.02 .05 -.10 -.13 .03

1875 1924 5 -.10 .00 .01 -.09 .05 .20 .06 -.34 -.25 .16 .27|-.08 -.14 .02 .06 .33\*-.01 .04 -.11 -.12 .04

[B] Entire series, effect on correlation ( 0.455) is:

Lower 1917>-0.025 1982>-0.020 1881>-0.018 1877<-0.013 1988<-0.009 1918>-0.008 Higher 1956 0.046 1948 0.013

1873 to 1922 segment:

Lower 1917>-0.078 1881>-0.055 1918>-0.025 1904<-0.018 1883>-0.016 1888<-0.015 Higher 1877 0.054 1882 0.049

1875 to 1924 segment:

Lower 1917>-0.077 1881>-0.054 1918>-0.024 1904<-0.018 1883>-0.016 1888<-0.015 Higher 1877 0.050 1882 0.049

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

25p02982 1873 to 2011 139 years Series 19

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

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

1873 1922 5 -.02 .03 .07 .03 .13 .07 -.22 -.26 -.18 .20 .11|-.15 -.10 -.03 -.05 .30\*-.12 .26 .13 -.03 .25

1875 1924 5 .02 .14 .15 .00 -.03 .00 -.17 -.26 -.15 .21 .15|-.18 -.17 -.04 -.04 .31\*-.11 .28 .19 .04 .27

[B] Entire series, effect on correlation ( 0.443) is:

Lower 1982>-0.027 1882>-0.022 1881>-0.012 1905>-0.012 2005>-0.011 1988<-0.010 Higher 1956 0.048 1948 0.038

1873 to 1922 segment:

Lower 1882>-0.067 1881>-0.039 1915<-0.027 1905>-0.021 1884>-0.014 1874<-0.012 Higher 1877 0.113 1918 0.086

1875 to 1924 segment:

Lower 1882>-0.065 1881>-0.036 1915<-0.028 1905>-0.022 1884>-0.014 1916<-0.013 Higher 1877 0.094 1918 0.080

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

1905 +3.1 SD; 1982 +4.0 SD

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26p02631 1869 to 2011 143 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

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1869 1918 -1 -.02 -.12 -.30 .16 .03 .00 -.15 -.10 -.01 .29\*-.13| .13 .13 .06 -.24 -.14 .02 -.12 -.19 .04 .27

1875 1924 -1 .16 .12 -.24 .02 -.06 -.07 -.27 -.02 .11 .37\*-.09| .01 .13 .07 -.22 -.10 -.09 -.08 -.08 .17 .24

1900 1949 8 .23 -.01 .08 .06 -.15 .06 -.25 .13 .19 -.07 .23|-.23 .17 .05 -.17 .09 -.04 -.08 .28\*-.08 .25

[B] Entire series, effect on correlation ( 0.412) is:

Lower 1877>-0.033 2003>-0.018 1871<-0.017 1908<-0.014 1935>-0.014 1948>-0.012 Higher 1956 0.091 1940 0.016

1869 to 1918 segment:

Lower 1877>-0.083 1916<-0.029 1896<-0.024 1911>-0.021 1908<-0.016 1871<-0.012 Higher 1882 0.077 1886 0.028

1875 to 1924 segment:

Lower 1877>-0.086 1916<-0.032 1896<-0.025 1911>-0.021 1908<-0.017 1919<-0.014 Higher 1882 0.081 1924 0.045

1900 to 1949 segment:

Lower 1908<-0.035 1935>-0.034 1916<-0.031 1911>-0.025 1917>-0.015 1919<-0.013 Higher 1940 0.071 1924 0.025

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

1877 +3.5 SD

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26p02801 1887 to 2011 125 years Series 21

[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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1887 1936 7 .02 -.10 -.26 .09 .19 .07 .01 -.12 .16 .13 .22|-.30 -.01 .04 -.10 .23 -.30 .29\* .02 -.08 .20

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

Lower 1888<-0.015 1913<-0.014 1961<-0.011 1982>-0.011 1906>-0.011 1922<-0.011 Higher 1918 0.035 1956 0.032

1887 to 1936 segment:

Lower 1913<-0.034 1888<-0.032 1917>-0.032 1906>-0.030 1909>-0.026 1897>-0.024 Higher 1918 0.192 1925 0.028

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26p02632 1869 to 2011 143 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

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1869 1918 -1 -.09 .05 -.39 .18 .11 -.07 -.15 -.23 .14 .66\*-.08|-.05 -.14 .09 .18 -.07 .04 -.03 -.21 .17 .04

1875 1924 -1 -.10 -.01 -.38 .10 .15 .08 -.12 -.25 .00 .67\*-.06|-.10 -.05 .11 .19 -.17 .04 -.02 -.23 .10 .01

1900 1949 -5 .12 -.13 -.02 -.06 -.24 .33\*-.02 .05 -.06 .02 .26|-.22 .05 .07 -.10 -.07 .06 -.28 .25 -.11 .05

[B] Entire series, effect on correlation ( 0.360) is:

Lower 1878<-0.054 1877>-0.032 1917>-0.023 1935>-0.019 1869>-0.012 1918>-0.011 Higher 1956 0.044 1948 0.018

1869 to 1918 segment:

Lower 1877>-0.068 1917>-0.049 1869>-0.024 1878<-0.019 1897>-0.017 1893>-0.016 Higher 1882 0.062 1875 0.021

1875 to 1924 segment:

Lower 1877>-0.072 1917>-0.052 1878<-0.020 1893>-0.019 1897>-0.018 1887>-0.013 Higher 1882 0.060 1875 0.019

1900 to 1949 segment:

Lower 1917>-0.078 1935>-0.059 1918>-0.032 1920>-0.027 1932<-0.019 1919<-0.015 Higher 1948 0.102 1941 0.062

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

1877 1878 -5.0 SD

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

1877 +3.2 SD

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26p02802 1886 to 2011 126 years Series 23

[B] Entire series, effect on correlation ( 0.585) is:

Lower 1891<-0.015 1942>-0.012 1926>-0.010 1982>-0.010 1992<-0.010 1974>-0.009 Higher 1956 0.067 1981 0.017

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27p03292 1892 to 2011 120 years Series 24

[B] Entire series, effect on correlation ( 0.704) is:

Lower 1996>-0.018 1918>-0.013 1933<-0.010 1971<-0.009 1989<-0.007 1973<-0.006 Higher 1948 0.049 2003 0.016

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27p03291 1892 to 2011 120 years Series 25

[B] Entire series, effect on correlation ( 0.667) is:

Lower 1905<-0.025 1925>-0.024 1920<-0.019 1921<-0.018 1894<-0.010 1980<-0.008 Higher 1948 0.049 1956 0.045

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27p02912 1878 to 2011 134 years Series 26

[B] Entire series, effect on correlation ( 0.489) is:

Lower 1956>-0.014 2000>-0.013 1995<-0.013 2003>-0.013 1897<-0.012 1954<-0.010 Higher 1882 0.017 1918 0.016

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27p02911 1878 to 2011 134 years Series 27

[B] Entire series, effect on correlation ( 0.731) is:

Lower 1896<-0.014 1994>-0.009 1881>-0.008 1934>-0.007 1884<-0.007 1971<-0.006 Higher 1956 0.032 1948 0.029

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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 13p02831 1828 2011 184 7 1 0.547 0.57 2.37 0.470 0.890 0.242 2.73 0.353 -0.026 1

2 13p02832 1828 2011 184 7 1 0.595 0.67 3.18 0.619 0.879 0.259 2.57 0.374 -0.082 1

3 14p02481 1885 2011 127 5 0 0.583 0.86 2.16 0.374 0.545 0.338 2.55 0.421 -0.029 1

4 14p02482 1885 2011 127 5 0 0.571 0.72 1.43 0.282 0.491 0.357 2.62 0.465 -0.026 1

5 21p02721 1913 2011 99 4 0 0.716 1.05 1.84 0.364 0.767 0.218 2.51 0.449 -0.091 1

6 21p02722 1913 2011 99 4 0 0.683 0.83 1.93 0.540 0.908 0.287 2.44 0.354 -0.041 1

7 22p0t221 1907 2011 105 4 0 0.478 0.89 1.99 0.469 0.893 0.227 2.76 0.563 -0.050 1

8 22p0t441 1903 2011 109 4 2 0.371 1.39 4.05 0.942 0.928 0.227 2.52 0.417 -0.063 2

9 22p0t442 1902 2011 110 4 0 0.678 1.17 3.52 0.874 0.929 0.240 2.63 0.410 -0.025 1

10 22p0t481 1922 2011 90 4 0 0.614 1.75 4.07 0.683 0.824 0.182 2.71 0.453 0.033 1

11 22p0t482 1871 2011 141 6 2 0.408 1.61 4.30 0.794 0.868 0.206 3.38 0.442 -0.056 1

12 24p04172 1858 2011 154 6 2 0.526 1.15 3.37 0.707 0.897 0.231 2.53 0.314 0.010 1

13 24p04171 1860 2011 152 6 1 0.559 1.08 2.68 0.583 0.857 0.212 2.56 0.413 -0.034 1

14 24p03602 1872 2011 140 6 0 0.744 1.27 2.91 0.541 0.632 0.276 2.74 0.432 -0.029 1

15 24p03601 1872 2011 140 6 0 0.633 1.04 2.44 0.466 0.734 0.267 2.65 0.475 -0.026 1

16 24p0t961 1943 2011 69 3 0 0.445 1.86 3.51 0.782 0.844 0.168 2.48 0.408 -0.042 1

17 24p0t962 1943 2011 69 3 0 0.564 2.30 4.06 0.665 0.751 0.170 2.45 0.482 -0.026 1

18 25p02981 1873 2011 139 6 2 0.455 1.06 2.70 0.632 0.862 0.244 2.58 0.388 -0.021 1

19 25p02982 1873 2011 139 6 2 0.443 0.95 2.49 0.571 0.851 0.268 2.81 0.411 -0.060 1

20 26p02631 1869 2011 143 6 3 0.412 0.87 2.58 0.565 0.872 0.251 2.71 0.419 -0.028 1

21 26p02801 1887 2011 125 5 1 0.404 0.89 2.34 0.594 0.862 0.304 2.72 0.490 -0.065 1

22 26p02632 1869 2011 143 6 3 0.360 0.75 2.53 0.507 0.834 0.292 2.58 0.354 -0.033 1

23 26p02802 1886 2011 126 5 0 0.585 0.98 3.23 0.806 0.903 0.293 2.74 0.458 0.006 1

24 27p03292 1892 2011 120 5 0 0.704 1.12 1.99 0.288 0.522 0.199 2.57 0.421 -0.002 1

25 27p03291 1892 2011 120 5 0 0.667 1.06 2.77 0.451 0.664 0.234 3.01 0.473 -0.016 1

26 27p02912 1878 2011 134 5 0 0.489 0.80 1.72 0.414 0.822 0.258 2.76 0.479 -0.015 1

27 27p02911 1878 2011 134 5 0 0.731 1.14 2.64 0.586 0.852 0.250 2.69 0.505 -0.041 1

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Total or mean: 3422 138 20 0.552 1.05 4.30 0.570 0.806 0.252 3.38 0.426 -0.033

- = [ COFECHA TEST COF ] = -