[] Dendrochronology Program Library Run FINA\_ Program COF 13:38 Fri 12 Jul 2013 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 28684

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Final

File of DATED series: BLTMid\_PCRU\_COMPLETEdataset\_2

CONTENTS:

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

Part 2: Histogram of time spans

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

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

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

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

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

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

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .3281

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

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

Time span of Master dating series is 1744 to 2012 269 years

Continuous time span is 1744 to 2012 269 years

Portion with two or more series is 1781 to 2012 232 years

>> 334A 1832 absent in 1 of 9 series, but is not usually narrow: master index is -.278

>> 341B 2009 absent in 1 of 28 series, but is not usually narrow: master index is 1.453

>> 341B 2010 absent in 1 of 28 series, but is not usually narrow: master index is .579

>> 417B 1927 absent in 1 of 23 series, but is not usually narrow: master index is .357

>> 417B 1928 absent in 1 of 23 series, but is not usually narrow: master index is .366

>> 417B 1929 absent in 1 of 23 series, but is not usually narrow: master index is .089

>> 417B 1930 absent in 1 of 23 series, but is not usually narrow: master index is -.259

>> 417B 1931 absent in 1 of 23 series, but is not usually narrow: master index is .320

>> 417B 1932 absent in 1 of 23 series, but is not usually narrow: master index is .848

>> 417B 1933 absent in 1 of 23 series, but is not usually narrow: master index is -.260

>> 417B 1934 absent in 1 of 23 series, but is not usually narrow: master index is 1.066

>> 417B 1938 absent in 1 of 23 series, but is not usually narrow: master index is .222

>> 417B 1939 absent in 1 of 23 series, but is not usually narrow: master index is .131

>> 417B 1941 absent in 1 of 23 series, but is not usually narrow: master index is .747

>> 417B 1942 absent in 1 of 24 series, but is not usually narrow: master index is .023

>> 417B 1944 absent in 1 of 25 series, but is not usually narrow: master index is -.084

>> 417B 1945 absent in 1 of 26 series, but is not usually narrow: master index is .176

>> 417B 1946 absent in 1 of 27 series, but is not usually narrow: master index is .413

>> 417B 1947 absent in 1 of 27 series, but is not usually narrow: master index is .802

>> 417B 1949 absent in 1 of 28 series, but is not usually narrow: master index is .622

>> 417B 1950 absent in 1 of 28 series, but is not usually narrow: master index is .164

>> 417B 1951 absent in 1 of 28 series, but is not usually narrow: master index is .285

>> 417B 1952 absent in 1 of 28 series, but is not usually narrow: master index is .801

>> 417B 1953 absent in 1 of 28 series, but is not usually narrow: master index is .442

>> 417B 1954 absent in 1 of 28 series, but is not usually narrow: master index is .493

>> 417B 1955 absent in 1 of 28 series, but is not usually narrow: master index is 1.360

>> 417B 1957 absent in 1 of 28 series, but is not usually narrow: master index is .845

>> 417B 1958 absent in 1 of 28 series, but is not usually narrow: master index is 1.658

>> 417B 1959 absent in 1 of 28 series, but is not usually narrow: master index is .178

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

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

\*O\* Master series 1744 2012 269 yrs \*O\*

\*F\* Total rings in all series 3833 \*F\*

\*E\* Total dated rings checked 3796 \*E\*

\*C\* Series intercorrelation .558 \*C\*

\*H\* Average mean sensitivity .246 \*H\*

\*A\* Segments, possible problems 2 \*A\*

\*\*\* Mean length of series 136.9 \*\*\*

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

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

334A 2 absent rings: 1820 1832

341A 1 absent rings: 2004

341B 3 absent rings: 1873 2009 2010

416A 1 absent rings: 1940

417B 34 absent rings: 1917 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941

1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957

1958 1959

41 absent rings 1.070%

PART 2: TIME PLOT OF TREE-RING SERIES: Final 13:38 Fri 12 Jul 2013 Page 2

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

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

. . . . . . . . . . . . . . . . . <==========> . 332A 1 1900 2012 113

. . . . . . . . . . . . . . . . . <=============> . 332B 2 1875 2012 138

. . . . . . . . . . . . . . . . . <============> . 333A 3 1886 2012 127

. . . . . . . . . . . . . . . . <==================> . 333B 4 1821 2012 192

. . . . . . . . . . . . . . . <====================> . 334A 5 1804 2012 209

. . . . . . . . . . . . . . . . . <=============> . 334B 6 1875 2012 138

. . . . . . . . . . . . . . . . . . <======> . 335A 7 1945 2012 68

. . . . . . . . . . . . . . . . . . <========> . 335B 8 1926 2012 87

. . . . . . . . . . . . . . . . . . <========> . 336A 9 1924 2012 89

. . . . . . . . . . . . . . . . . .<=========> . 336B 10 1918 2012 95

. . . . . . . . . . . . . . . . . . <======> . 337A 11 1942 2012 71

. . . . . . . . . . . . . . . . . <==========> . 337B 12 1903 2012 110

. . . . . . . . . . . . . . . . <===============> . 338A 13 1857 2012 156

. . . . . . . . . . . . . . . . . <============> . 338B 14 1881 2012 132

. . . . . . . . . . . . . . . . <=================> . 339A 15 1838 2012 175

. . . . . . . . . . . . . . . . <==================> . 339B 16 1822 2012 191

. . . . . . . . . . . . . . . . . . <========> . 340A 17 1925 2010 86

. . . . . . . . . . . . . . . . . . <======> . 340B 18 1946 2010 65

. . . . . . . . . . . . . . . . <=================> . 341A 19 1830 2010 181

. . . . . . . . . . . . . . . . <==================> . 341B 20 1827 2010 184

. . . . . . . . . . . . . . . . <==================> . 416A 21 1822 2012 191

. . . . . . . . . . . . . . . . <==================> . 416B 22 1823 2012 190

. . . . . . . . . . . . . . . <======================> . 417A 23 1781 2012 232

. . . . . . . . . . . . . . <==========================> . 417B 24 1744 2012 269

. . . . . . . . . . . . . . . . . .<=========> . 449A 25 1917 2012 96

. . . . . . . . . . . . . . . . . <==========> . 449B 26 1900 2012 113

. . . . . . . . . . . . . . . . . . <======> . 458A 27 1943 2012 70

. . . . . . . . . . . . . . . . . . <======> . 458B 28 1948 2012 65

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

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

PART 3: Master Dating Series: Final 13:38 Fri 12 Jul 2013 Page 3

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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1750 .077 1 1800 -.324 2 1850 -.919 10 1900 .426 17 1950 .164 28 1<<

1751 -.371 1 1801 2.104 2 1851 .165 10 1901 .221 17 1951 .285 28 1<<

1752 -.249 1 1802 .026 2 1852 -1.367 10 1902 .474 17 1952 .801 28 1<<

1753 .229 1 1803 .230 2 1853 .231 10 1903 .757 18 1953 .442 28 1<<

1754 .875 1 1804 -.320 3 1854 .008 10 1904 1.759 18 1954 .493 28 1<<

1755 -1.951 1 1805 .791 3 1855 .394 10 1905 1.392 18 1955 1.360 28 1<<

1756 -.036 1 1806 -1.921 3 1856 .979 10 1906 .878 18 1956 -.827 28 1

1757 -2.004 1 1807 2.462 3 1857 .635 11 1907 .503 18 1957 .845 28 1<<

1758 -1.730 1 1808 .595 3 1858 1.277 11 1908 .537 18 1958 1.658 28 1<<

1759 -.956 1 1809 -2.858 3 1859 .967 11 1909 -.363 18 1959 .178 28 1<<

1760 .309 1 1810 -.609 3 1860 .798 11 1910 .796 18 1960 -.275 28

1761 1.799 1 1811 .602 3 1861 .519 11 1911 -2.222 18 1961 .682 28

1762 .142 1 1812 .112 3 1862 .933 11 1912 -.339 18 1962 -.544 28

1763 1.182 1 1813 .038 3 1863 .599 11 1913 .505 18 1963 -.409 28

1764 1.577 1 1814 -1.552 3 1864 -.269 11 1914 -.419 18 1964 -.186 28

1765 2.136 1 1815 .470 3 1865 -.265 11 1915 -.227 18 1965 -.896 28

1766 .010 1 1816 .450 3 1866 -.676 11 1916 .769 18 1966 -1.049 28

1767 -2.423 1 1817 .010 3 1867 -.319 11 1917 -.807 19 1 1967 -1.057 28

1768 -.974 1 1818 -1.456 3 1868 -1.107 11 1918 -.353 20 1968 -1.049 28

1769 .213 1 1819 -.261 3 1869 -2.287 11 1919 .114 20 1969 -.146 28

1770 -1.971 1 1820 -2.013 3 1 1870 -.589 11 1920 -.108 20 1970 1.212 28

1771 -.530 1 1821 -.185 4 1871 -.217 11 1921 .410 20 1971 1.405 28

1772 -2.375 1 1822 .126 6 1872 -.194 11 1922 -.255 20 1972 .447 28

1773 1.139 1 1823 -.093 7 1873 -1.116 11 1 1923 -.557 20 1973 .611 28

1774 -1.009 1 1824 -.725 7 1874 -.557 11 1924 1.297 21 1974 -.807 28

1775 -.367 1 1825 .747 7 1875 .321 13 1925 -.962 22 1975 -.542 28

1776 -1.445 1 1826 .910 7 1876 -1.064 13 1926 .770 23 1976 -1.475 28

1777 1.102 1 1827 .586 8 1877 -1.455 13 1927 .357 23 1<< 1977 -1.876 28

1778 1.548 1 1828 -1.214 8 1878 -.114 13 1928 .366 23 1<< 1978 .072 28

1779 1.431 1 1829 -1.195 8 1879 -.185 13 1929 .089 23 1<< 1979 .628 28

1780 1.504 1 1830 -.004 9 1880 .456 13 1930 -.259 23 1<< 1980 1.311 28

1781 -.948 2 1831 -.801 9 1881 .729 14 1931 .320 23 1<< 1981 .297 28

1782 -.163 2 1832 -.278 9 1<< 1882 .313 14 1932 .848 23 1<< 1982 .778 28

1783 -1.122 2 1833 1.135 9 1883 -.331 14 1933 -.260 23 1<< 1983 .574 28

1784 1.116 2 1834 .368 9 1884 .116 14 1934 1.066 23 1<< 1984 .039 28

1785 1.736 2 1835 .627 9 1885 -.361 14 1935 -2.454 23 1 1985 .123 28

1786 1.883 2 1836 1.421 9 1886 1.128 15 1936 -1.495 23 1 1986 -1.091 28

1787 1.040 2 1837 .828 9 1887 -.283 15 1937 -1.425 23 1 1987 .607 28

1788 .514 2 1838 -.044 10 1888 .787 15 1938 .222 23 1<< 1988 .239 28

1789 -.287 2 1839 -.232 10 1889 .780 15 1939 .131 23 1<< 1989 .054 28

1790 -1.919 2 1840 .847 10 1890 .630 15 1940 -1.110 23 2 1990 .092 28

1791 -.004 2 1841 -.338 10 1891 .179 15 1941 .747 23 1<< 1991 .523 28

1792 -1.433 2 1842 .459 10 1892 .624 15 1942 .023 24 1<< 1992 .749 28

1793 1.323 2 1843 .275 10 1893 -1.997 15 1943 -.641 25 1 1993 1.157 28

1744 .070 1 1794 -.037 2 1844 -2.031 10 1894 -.888 15 1944 -.084 25 1<< 1994 .098 28

1745 -1.513 1 1795 -.210 2 1845 .275 10 1895 -.806 15 1945 .176 26 1<< 1995 .566 28

1746 1.684 1 1796 1.062 2 1846 1.100 10 1896 -.726 15 1946 .413 27 1<< 1996 -1.133 28

1747 -1.741 1 1797 1.713 2 1847 -.258 10 1897 -1.180 15 1947 .802 27 1<< 1997 -.648 28

1748 .910 1 1798 -.249 2 1848 .836 10 1898 -.236 15 1948 -1.334 28 1 1998 -.265 28

1749 3.637 1 1799 -1.740 2 1849 -.893 10 1899 -.104 15 1949 .622 28 1<< 1999 .216 28

PART 3: Master Dating Series: Final 13:38 Fri 12 Jul 2013 Page 4

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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2000 -1.401 28

2001 .260 28

2002 .618 28

2003 -.653 28

2004 -1.854 28 1

2005 -1.132 28

2006 -.959 28

2007 .833 28

2008 .600 28

2009 1.453 28 1<<

2010 .579 28 1<<

2011 -.511 24

2012 .635 24

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PART 4: Master Bar Plot: Final 13:38 Fri 12 Jul 2013 Page 5

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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

1750-----@ 1800---a 1850--d 1900-------B 1950-----A 2000-f

1751---a 1801----------H 1851-----A 1901------A 1951------A 2001------A

1752---a 1802-----@ 1852-e 1902-------B 1952--------C 2002-------B

1753------A 1803------A 1853------A 1903--------C 1953-------B 2003--c

1754---------C 1804---a 1854-----@ 1904----------G 1954-------B 2004g

1755h 1805--------C 1855------B 1905----------F 1955----------E 2005-e

1756-----@ 1806h 1856---------D 1906---------D 1956--c 2006-d

1757h 1807----------J 1857--------C 1907-------B 1957--------C 2007--------C

1758g 1808-------B 1858---------E 1908-------B 1958----------G 2008-------B

1759-d 1809k 1859---------D 1909---a 1959-----A 2009----------F

1760------A 1810--b 1860--------C 1910--------C 1960---a 2010-------B

1761----------G 1811-------B 1861-------B 1911i 1961--------C 2011---b

1762-----A 1812-----@ 1862---------D 1912---a 1962--b 2012--------C

1763---------E 1813-----@ 1863-------B 1913-------B 1963---b

1764----------F 1814f 1864---a 1914---b 1964----a

1765----------I 1815-------B 1865---a 1915----a 1965--d

1766-----@ 1816-------B 1866--c 1916--------C 1966-d

1767j 1817-----@ 1867---a 1917--c 1967-d

1768-d 1818-f 1868-d 1918---a 1968-d

1769------A 1819---a 1869i 1919-----@ 1969----a

1770h 1820h 1870--b 1920----@ 1970---------E

1771--b 1821----a 1871----a 1921-------B 1971----------F

1772j 1822-----A 1872----a 1922---a 1972-------B

1773---------E 1823----@ 1873-d 1923--b 1973-------B

1774-d 1824--c 1874--b 1924----------E 1974--c

1775---a 1825--------C 1875------A 1925-d 1975--b

1776-f 1826---------D 1876-d 1926--------C 1976-f

1777---------D 1827-------B 1877-f 1927------A 1977h

1778----------F 1828-e 1878----@ 1928------A 1978-----@

1779----------F 1829-e 1879----a 1929-----@ 1979-------C

1780----------F 1830-----@ 1880-------B 1930---a 1980----------E

1781-d 1831--c 1881--------C 1931------A 1981------A

1782----a 1832---a 1882------A 1932--------C 1982--------C

1783-d 1833---------E 1883---a 1933---a 1983-------B

1784---------D 1834------A 1884-----@ 1934---------D 1984-----@

1785----------G 1835-------C 1885---a 1935j 1985-----@

1786----------H 1836----------F 1886---------E 1936-f 1986-d

1787---------D 1837--------C 1887---a 1937-f 1987-------B

1788-------B 1838----@ 1888--------C 1938------A 1988------A

1789---a 1839----a 1889--------C 1939-----A 1989-----@

1790h 1840--------C 1890-------C 1940-d 1990-----@

1791-----@ 1841---a 1891-----A 1941--------C 1991-------B

1792-f 1842-------B 1892-------B 1942-----@ 1992--------C

1793----------E 1843------A 1893h 1943--c 1993---------E

1744-----@ 1794----@ 1844h 1894--d 1944----@ 1994-----@

1745-f 1795----a 1845------A 1895--c 1945-----A 1995-------B

1746----------G 1796---------D 1846---------D 1896--c 1946-------B 1996-e

1747g 1797----------G 1847---a 1897-e 1947--------C 1997--c

1748---------D 1798---a 1848--------C 1898----a 1948-e 1998---a

1749----------O 1799g 1849--d 1899----@ 1949-------B 1999------A

PART 5: CORRELATION OF SERIES BY SEGMENTS: Final 13:38 Fri 12 Jul 2013 Page 5

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Correlations of 50-year dated segments, lagged 25 years

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

Seq Series Time\_span 1775 1800 1825 1850 1875 1900 1925 1950 1975

1824 1849 1874 1899 1924 1949 1974 1999 2024

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

1 332A 1900 2012 .77 .75 .45 .43

2 332B 1875 2012 .50 .62 .68 .61 .65

3 333A 1886 2012 .74 .72 .63 .55 .60

4 333B 1821 2012 .38 .43 .41 .54 .65 .69 .54 .48

5 334A 1804 2012 .41 .47 .50 .75 .83 .77 .66 .67

6 334B 1875 2012 .57 .85 .80 .57 .47

7 335A 1945 2012 .44 .41 .38

8 335B 1926 2012 .61 .16B .15B

9 336A 1924 2012 .44 .45 .61 .54

10 336B 1918 2012 .50 .55 .63 .74

11 337A 1942 2012 .54 .68 .59

12 337B 1903 2012 .55 .66 .63 .66

13 338A 1857 2012 .48 .50 .50 .50 .47 .56

14 338B 1881 2012 .64 .56 .37 .40 .49

15 339A 1838 2012 .54 .48 .54 .59 .62 .56 .70

16 339B 1822 2012 .42 .38 .47 .62 .64 .58 .57 .47

17 340A 1925 2010 .45 .64 .66

18 340B 1946 2010 .47 .58 .57

19 341A 1830 2010 .49 .46 .53 .66 .66 .59 .60

20 341B 1827 2010 .67 .56 .50 .63 .70 .65 .72

21 416A 1822 2012 .37 .36 .46 .40 .48 .52 .65 .69

22 416B 1823 2012 .48 .50 .70 .65 .74 .74 .53 .54

23 417A 1781 2012 .63 .66 .68 .68 .72 .72 .71 .45 .49

24 417B 1744 2012 .62 .59 .60 .64 .59 .59 .39 .45 .59

25 449A 1917 2012 .57 .68 .65 .59

26 449B 1900 2012 .62 .83 .65 .59

27 458A 1943 2012 .50 .56 .59

28 458B 1948 2012 .47 .41 .42

Av segment correlation .62 .47 .51 .53 .59 .63 .60 .55 .56

PART 6: POTENTIAL PROBLEMS: Final 13:38 Fri 12 Jul 2013 Page 6

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

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

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

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

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

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

[D] Absent rings (zero values)

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

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332A 1900 to 2012 113 years Series 1

[B] Entire series, effect on correlation ( .659) is:

Lower 1905< -.019 1976> -.019 1974> -.016 1977> -.013 2003> -.011 1926< -.008 Higher 1935 .069 1911 .039

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

1977 +3.0 SD

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332B 1875 to 2012 138 years Series 2

[B] Entire series, effect on correlation ( .603) is:

Lower 1918< -.024 1925> -.021 1897< -.012 1876> -.009 1965> -.008 1896> -.007 Higher 1935 .022 1893 .021

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333A 1886 to 2012 127 years Series 3

[B] Entire series, effect on correlation ( .689) is:

Lower 1970< -.015 1962> -.015 1918< -.008 1940< -.008 1971< -.006 1966< -.006 Higher 1893 .023 1948 .013

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333B 1821 to 2012 192 years Series 4

[B] Entire series, effect on correlation ( .538) is:

Lower 1982< -.013 1853< -.010 1823> -.009 2011> -.009 1908< -.008 1929< -.007 Higher 1935 .029 1893 .022

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

1989 +3.1 SD

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

334A 1804 to 2012 209 years Series 5

[B] Entire series, effect on correlation ( .567) is:

Lower 1814> -.033 1809> -.030 1820< -.014 1818> -.007 1832< -.006 1872< -.006 Higher 1911 .024 1935 .014

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

1820 1821 4.4 SD

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

1820 -2.013 3 1

Present in series 23 417A time span 1781 to 2012

Present in series 24 417B time span 1744 to 2012

1832 -.278 9 1 >> WARNING: Ring is not usually narrow

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

1809 +3.6 SD; 1814 +4.4 SD; 1820 -7.9 SD

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334B 1875 to 2012 138 years Series 6

[B] Entire series, effect on correlation ( .637) is:

Lower 1876> -.021 1893> -.013 2003> -.010 1986> -.010 1886< -.010 1994< -.009 Higher 1911 .042 1935 .035

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

1876 +3.3 SD; 1894 +3.1 SD

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

335A 1945 to 2012 68 years Series 7

[B] Entire series, effect on correlation ( .451) is:

Lower 1945< -.071 1986> -.024 1980< -.023 2000> -.019 1974> -.018 1976> -.015 Higher 1948 .077 2009 .017

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

1986 +3.5 SD; 1997 -6.2 SD

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335B 1926 to 2012 87 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 -.38 -.05 -.24 -.13 -.09 .07 .10 .37\* .02 .03 .16|-.18 -.24 .14 .05 .16 .27 .31 -.02 -.09 -.29

1963 2012 -3 -.21 -.15 -.29 .08 -.10 .11 .01 .41\* .17 -.05 .15| - - - - - - - - - -

[B] Entire series, effect on correlation ( .469) is:

Lower 1996> -.037 1974> -.024 1993< -.020 1999< -.019 1976> -.016 2004> -.015 Higher 1935 .175 2009 .015

1950 to 1999 segment:

Lower 1996> -.074 1974> -.047 1993< -.039 1999< -.032 1976> -.026 1971< -.024 Higher 1977 .054 1987 .034

1963 to 2012 segment:

Lower 1996> -.067 1974> -.043 1993< -.038 1999< -.033 1976> -.024 1971< -.023 Higher 2009 .059 1977 .047

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

1974 +3.2 SD; 1975 +3.1 SD; 1976 +3.5 SD; 1996 +3.9 SD

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336A 1924 to 2012 89 years Series 9

[B] Entire series, effect on correlation ( .482) is:

Lower 1925> -.021 2003> -.018 2011> -.016 1962< -.013 1946< -.013 1951< -.013 Higher 2000 .021 1956 .021

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336B 1918 to 2012 95 years Series 10

[B] Entire series, effect on correlation ( .590) is:

Lower 1946< -.043 1948> -.031 1951< -.020 1928< -.017 1962< -.017 1940> -.013 Higher 1935 .085 2000 .018

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337A 1942 to 2012 71 years Series 11

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

Lower 1948> -.060 2003< -.025 2011> -.014 2006> -.013 1979< -.013 2007< -.009 Higher 2004 .017 1986 .016

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337B 1903 to 2012 110 years Series 12

[B] Entire series, effect on correlation ( .606) is:

Lower 1921< -.024 2006> -.018 1948> -.017 1936> -.015 1933> -.012 1924< -.011 Higher 1935 .087 1911 .019

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

1936 +3.1 SD; 2006 +3.3 SD

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338A 1857 to 2012 156 years Series 13

[B] Entire series, effect on correlation ( .490) is:

Lower 1972< -.025 1911> -.021 1869> -.017 1934< -.016 1880< -.016 1961< -.012 Higher 1893 .033 1935 .026

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

1869 +3.8 SD; 1870 +3.4 SD

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338B 1881 to 2012 132 years Series 14

[B] Entire series, effect on correlation ( .462) is:

Lower 1959< -.020 1948> -.020 1934< -.019 1955< -.019 1988< -.011 1996> -.011 Higher 1911 .052 1925 .014

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

1917 -5.7 SD

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339A 1838 to 2012 175 years Series 15

[B] Entire series, effect on correlation ( .586) is:

Lower 1953< -.010 1867> -.009 1935> -.008 1839< -.008 1847> -.007 1962> -.006 Higher 1948 .011 1925 .011

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

1867 +3.3 SD

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339B 1822 to 2012 191 years Series 16

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

Lower 2006< -.023 1832< -.011 1844> -.011 1872< -.010 1986> -.009 2000> -.008 Higher 1911 .014 1996 .009

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

2005 2006 -4.2 SD

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

1875 +3.5 SD; 2006 -5.4 SD

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340A 1925 to 2010 86 years Series 17

[B] Entire series, effect on correlation ( .519) is:

Lower 1931< -.127 1925> -.013 1941< -.010 1996> -.008 1986> -.008 1978< -.008 Higher 1935 .016 1948 .014

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

1931 -6.0 SD

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340B 1946 to 2010 65 years Series 18

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

Lower 2004> -.033 1948> -.032 1949< -.024 1952< -.018 1977> -.017 1963> -.009 Higher 2000 .040 1996 .026

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341A 1830 to 2010 181 years Series 19

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

Lower 1844< -.022 1830< -.012 2006> -.009 1897> -.008 1957< -.007 1918< -.006 Higher 1925 .013 1911 .011

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

1843 1844 -4.2 SD

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

2004 -1.854 28 1

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

1844 -8.0 SD; 1931 +3.2 SD

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341B 1827 to 2010 184 years Series 20

[B] Entire series, effect on correlation ( .602) is:

Lower 2009< -.020 1873< -.012 1888< -.009 1876> -.008 1917> -.007 1990< -.007 Higher 1948 .013 1844 .013

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

1873 -1.116 11 1

2009 1.453 28 1 >> WARNING: Ring is not usually narrow

2010 .579 28 1 >> 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

1873 -4.8 SD

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416A 1822 to 2012 191 years Series 21

[B] Entire series, effect on correlation ( .473) is:

Lower 1829> -.033 1935> -.023 1893> -.018 1847> -.010 1876> -.010 1845< -.009 Higher 1948 .017 1911 .015

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

1940 -1.110 23 2

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

1829 +6.0 SD; 1844 +3.2 SD; 1918 +3.1 SD; 1940 -6.3 SD

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416B 1823 to 2012 190 years Series 22

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

Lower 1831> -.015 1829< -.015 1956> -.010 1917> -.009 1999< -.007 2004> -.006 Higher 1935 .043 1844 .015

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

1869 -5.5 SD; 1925 -4.6 SD

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417A 1781 to 2012 232 years Series 23

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

Lower 1814< -.024 1789> -.008 1976> -.008 1798> -.006 1977> -.006 1870< -.005 Higher 1911 .018 1935 .014

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

1814 -5.0 SD; 1977 +3.0 SD

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417B 1744 to 2012 269 years Series 24

[\*] Early part of series cannot be checked from 1744 to 1780 -- not matched by another series

[B] Entire series, effect on correlation ( .517) is:

Lower 1935> -.018 1960> -.015 1992< -.008 1948> -.008 1789< -.006 1927< -.006 Higher 1893 .018 1809 .017

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

1959 1960 4.3 SD

[D] 34 Absent rings: Year Master N series Absent

1917 -.807 19 1

1927 .357 23 1 >> WARNING: Ring is not usually narrow

1928 .366 23 1 >> WARNING: Ring is not usually narrow

1929 .089 23 1 >> WARNING: Ring is not usually narrow

1930 -.259 23 1 >> WARNING: Ring is not usually narrow

1931 .320 23 1 >> WARNING: Ring is not usually narrow

1932 .848 23 1 >> WARNING: Ring is not usually narrow

1933 -.260 23 1 >> WARNING: Ring is not usually narrow

1934 1.066 23 1 >> WARNING: Ring is not usually narrow

1935 -2.454 23 1

1936 -1.495 23 1

1937 -1.425 23 1

1938 .222 23 1 >> WARNING: Ring is not usually narrow

1939 .131 23 1 >> WARNING: Ring is not usually narrow

1940 -1.110 23 2

1941 .747 23 1 >> WARNING: Ring is not usually narrow

1942 .023 24 1 >> WARNING: Ring is not usually narrow

1943 -.641 25 1

1944 -.084 25 1 >> WARNING: Ring is not usually narrow

1945 .176 26 1 >> WARNING: Ring is not usually narrow

1946 .413 27 1 >> WARNING: Ring is not usually narrow

1947 .802 27 1 >> WARNING: Ring is not usually narrow

1948 -1.334 28 1

1949 .622 28 1 >> WARNING: Ring is not usually narrow

1950 .164 28 1 >> WARNING: Ring is not usually narrow

1951 .285 28 1 >> WARNING: Ring is not usually narrow

1952 .801 28 1 >> WARNING: Ring is not usually narrow

1953 .442 28 1 >> WARNING: Ring is not usually narrow

1954 .493 28 1 >> WARNING: Ring is not usually narrow

1955 1.360 28 1 >> WARNING: Ring is not usually narrow

1956 -.827 28 1

1957 .845 28 1 >> WARNING: Ring is not usually narrow

1958 1.658 28 1 >> WARNING: Ring is not usually narrow

1959 .178 28 1 >> WARNING: Ring is not usually narrow

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

1960 +5.0 SD

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449A 1917 to 2012 96 years Series 25

[B] Entire series, effect on correlation ( .573) is:

Lower 1924< -.028 2003< -.022 1940> -.017 1917> -.013 1996> -.012 2011> -.011 Higher 1935 .107 1970 .010

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449B 1900 to 2012 113 years Series 26

[B] Entire series, effect on correlation ( .626) is:

Lower 1924< -.074 1900< -.031 1904< -.021 2002< -.016 1986> -.014 1922> -.010 Higher 1935 .082 1911 .046

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

1923 1924 -4.3 SD

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458A 1943 to 2012 70 years Series 27

[B] Entire series, effect on correlation ( .558) is:

Lower 1973< -.053 1948> -.052 1979< -.028 2000> -.016 1962> -.012 1967> -.008 Higher 2004 .028 1980 .012

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458B 1948 to 2012 65 years Series 28

[B] Entire series, effect on correlation ( .456) is:

Lower 1981< -.107 1974> -.021 1956> -.018 2000> -.016 1949< -.015 1952< -.012 Higher 1948 .052 1986 .019

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

1998 +3.6 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 ()

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1 332A 1900 2012 113 4 0 .659 1.47 3.80 .869 .880 .229 2.59 .415 -.008 1

2 332B 1875 2012 138 5 0 .603 1.48 3.78 .925 .868 .263 2.73 .498 .033 1

3 333A 1886 2012 127 5 0 .689 1.51 2.99 .475 .680 .213 2.56 .421 -.032 1

4 333B 1821 2012 192 8 0 .538 1.00 2.12 .512 .864 .207 2.59 .443 -.036 1

5 334A 1804 2012 209 8 0 .567 1.03 2.92 .602 .894 .250 2.58 .291 -.070 1

6 334B 1875 2012 138 5 0 .637 1.26 3.52 .704 .865 .226 2.54 .384 -.083 1

7 335A 1945 2012 68 3 0 .451 2.46 5.04 1.040 .842 .249 2.43 .417 -.030 2

8 335B 1926 2012 87 3 2 .469 2.77 5.46 1.244 .901 .175 2.54 .369 -.014 2

9 336A 1924 2012 89 4 0 .482 2.54 5.11 1.328 .887 .184 2.58 .445 -.022 1

10 336B 1918 2012 95 4 0 .590 2.17 4.71 1.141 .907 .203 2.42 .489 -.078 1

11 337A 1942 2012 71 3 0 .540 2.38 5.07 1.087 .852 .201 2.56 .407 .041 3

12 337B 1903 2012 110 4 0 .606 1.90 5.19 1.051 .814 .287 2.66 .377 -.049 1

13 338A 1857 2012 156 6 0 .490 1.40 4.31 1.044 .898 .266 2.81 .504 .001 1

14 338B 1881 2012 132 5 0 .462 1.75 5.34 1.361 .934 .241 2.79 .441 -.087 1

15 339A 1838 2012 175 7 0 .586 .97 2.65 .485 .667 .295 2.75 .510 -.025 1

16 339B 1822 2012 191 8 0 .485 1.24 3.07 .658 .770 .290 2.73 .380 .009 1

17 340A 1925 2010 86 3 0 .519 1.30 3.12 .522 .692 .215 2.62 .413 -.033 1

18 340B 1946 2010 65 3 0 .514 1.53 4.20 .698 .688 .231 2.67 .499 -.030 1

19 341A 1830 2010 181 7 0 .549 .82 2.29 .433 .786 .301 2.54 .277 -.039 1

20 341B 1827 2010 184 7 0 .602 .84 3.63 .540 .882 .291 2.80 .384 -.009 1

21 416A 1822 2012 191 8 0 .473 .70 2.63 .446 .816 .302 3.03 .440 .045 1

22 416B 1823 2012 190 8 0 .611 .80 3.08 .467 .824 .269 2.51 .373 -.060 1

23 417A 1781 2012 232 9 0 .636 .81 1.72 .341 .786 .228 2.73 .438 -.001 1

24 417B 1744 2012 269 9 0 .517 .69 2.57 .527 .893 .240 2.85 .331 -.050 1

25 449A 1917 2012 96 4 0 .573 1.66 3.67 .825 .882 .227 2.84 .416 .074 1

26 449B 1900 2012 113 4 0 .626 1.65 3.52 .960 .931 .207 2.44 .376 .025 2

27 458A 1943 2012 70 3 0 .558 2.37 3.55 .609 .694 .175 2.51 .469 .040 1

28 458B 1948 2012 65 3 0 .456 2.38 3.99 .582 .605 .180 2.51 .411 .008 2

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Total or mean: 3833 150 2 .558 1.32 5.46 .702 .829 .246 3.03 .407 -.021

- = [ COFECHA FINA\_COF ] = -