[] Dendrochronology Program Library Run 86 Program COF 15:49 Wed 20 Apr 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27870

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: 86\_KIL

CONTENTS:

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

Part 2: Histogram of time spans

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

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

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

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 30 years lagged successively by 15 years

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

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

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .4226

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

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

Time span of Master dating series is 1817 to 2010 194 years

Continuous time span is 1817 to 2010 194 years

Portion with two or more series is 1836 to 2010 175 years

>> 383A 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 383A 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 383A 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 383A 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

>> 383B 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 383B 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 383B 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 383B 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

>> 384B 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 387A 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 387A 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 387A 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 387A 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

>> 387B 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 387B 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 387B 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 387B 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

>> 389A 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 389A 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 389A 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 389A 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

>> 527A 2002 absent in 1 of 22 series, but is not usually narrow: master index is .848

>> 527A 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 527A 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 527A 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 527A 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

>> 527B 2007 absent in 8 of 22 series, but is not usually narrow: master index is .492

>> 527B 2008 absent in 7 of 22 series, but is not usually narrow: master index is .328

>> 527B 2009 absent in 7 of 22 series, but is not usually narrow: master index is .106

>> 527B 2010 absent in 7 of 22 series, but is not usually narrow: master index is 1.441

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

\*C\* Number of dated series 22 \*C\*

\*O\* Master series 1817 2010 194 yrs \*O\*

\*F\* Total rings in all series 2036 \*F\*

\*E\* Total dated rings checked 2017 \*E\*

\*C\* Series intercorrelation .649 \*C\*

\*H\* Average mean sensitivity .258 \*H\*

\*A\* Segments, possible problems 15 \*A\*

\*\*\* Mean length of series 92.5 \*\*\*

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

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

383A 5 absent rings: 2006 2007 2008 2009 2010

383B 4 absent rings: 2007 2008 2009 2010

384B 2 absent rings: 2006 2007

387A 6 absent rings: 2005 2006 2007 2008 2009 2010

387B 5 absent rings: 2006 2007 2008 2009 2010

389A 7 absent rings: 1966 2005 2006 2007 2008 2009 2010

389B 1 absent rings: 1966

527A 9 absent rings: 2002 2003 2004 2005 2006 2007 2008 2009 2010

527B 6 absent rings: 2005 2006 2007 2008 2009 2010

45 absent rings 2.210%

PART 2: TIME PLOT OF TREE-RING SERIES: 15:49 Wed 20 Apr 2011 Page 2

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

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

. . . . . . . . . . . . . . . . . . <=======> . 382A 1 1936 2010 75

. . . . . . . . . . . . . . . . . . <=======> . 382B 2 1937 2010 74

. . . . . . . . . . . . . . . . . . <========> . 383A 3 1926 2010 85

. . . . . . . . . . . . . . . . . . <=======> . 383B 4 1932 2010 79

. . . . . . . . . . . . . . . . . .<=========> . 384A 5 1914 2010 97

. . . . . . . . . . . . . . . . . .<=========> . 384B 6 1910 2010 101

. . . . . . . . . . . . . . . . . . <=======> . 385A 7 1939 2010 72

. . . . . . . . . . . . . . . . . . <=======> . 385B 8 1935 2010 76

. . . . . . . . . . . . . . . . . .<=========> . 386A 9 1917 2010 94

. . . . . . . . . . . . . . . . . .<=========> . 386B 10 1917 2010 94

. . . . . . . . . . . . . . . . . . <=======> . 387A 11 1933 2010 78

. . . . . . . . . . . . . . . . . . <=======> . 387B 12 1938 2010 73

. . . . . . . . . . . . . . . . . . <========> . 388A 13 1927 2010 84

. . . . . . . . . . . . . . . . . . <========> . 388B 14 1925 2010 86

. . . . . . . . . . . . . . . . . . <=======> . 389A 15 1933 2010 78

. . . . . . . . . . . . . . . . . . <========> . 389B 16 1929 2010 82

. . . . . . . . . . . . . . . . . . <========> . 390A 17 1923 2010 88

. . . . . . . . . . . . . . . . . . <========> . 390B 18 1924 2010 87

. . . . . . . . . . . . . . . . . . <=======> . 391A 19 1934 2010 77

. . . . . . . . . . . . . . . . . . <========> . 391B 20 1924 2010 87

. . . . . . . . . . . . . . . .<===================> . 527A 21 1817 2010 194

. . . . . . . . . . . . . . . . <=================> . 527B 22 1836 2010 175

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

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: 15:49 Wed 20 Apr 2011 Page 3

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

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1850 -.104 2 1900 1.774 2 1950 -1.005 22 2000 -.324 22

1851 .353 2 1901 .040 2 1951 -.123 22 2001 1.068 22

1852 -.115 2 1902 .673 2 1952 .286 22 2002 .848 22 1<<

1853 -.254 2 1903 .665 2 1953 .156 22 2003 -1.423 22 1

1854 -.582 2 1904 1.963 2 1954 .603 22 2004 -1.551 22 1

1855 -.400 2 1905 .586 2 1955 1.843 22 2005 -1.352 22 4

1856 .355 2 1906 1.198 2 1956 -.580 22 2006 -.772 22 7

1857 .471 2 1907 .473 2 1957 .787 22 2007 .492 22 8<<

1858 .322 2 1908 1.041 2 1958 .900 22 2008 .328 22 7<<

1859 1.965 2 1909 -1.431 2 1959 .109 22 2009 .106 22 7<<

1860 .831 2 1910 -.123 3 1960 .190 22 2010 1.441 22 7<<

1861 1.719 2 1911 -1.234 3 1961 1.209 22

1862 -1.546 2 1912 .221 3 1962 -.172 22

1863 -.201 2 1913 1.154 3 1963 -.583 22

1864 .302 2 1914 -.552 4 1964 -1.673 22

1865 -1.397 2 1915 -.986 4 1965 -2.146 22

1866 -.956 2 1916 .512 4 1966 -2.155 22 2

1817 1.385 1 1867 .344 2 1917 -.431 6 1967 -.926 22

1818 -.567 1 1868 .273 2 1918 -2.002 6 1968 -.553 22

1819 .709 1 1869 -.927 2 1919 -.174 6 1969 -.234 22

1820 -2.293 1 1870 1.581 2 1920 .051 6 1970 .584 22

1821 .916 1 1871 -1.195 2 1921 .177 6 1971 1.234 22

1822 .078 1 1872 -.093 2 1922 .442 6 1972 .506 22

1823 .205 1 1873 -1.527 2 1923 .471 7 1973 .167 22

1824 -.056 1 1874 -.820 2 1924 1.083 9 1974 -.163 22

1825 -.153 1 1875 -.118 2 1925 -.166 10 1975 .664 22

1826 -4.566 1 1876 -1.373 2 1926 -1.319 11 1976 .271 22

1827 -1.639 1 1877 -.198 2 1927 -1.244 12 1977 .239 22

1828 .043 1 1878 .276 2 1928 -.714 12 1978 -.103 22

1829 .926 1 1879 2.416 2 1929 -1.028 13 1979 -.169 22

1830 .956 1 1880 2.379 2 1930 -.368 13 1980 1.291 22

1831 1.422 1 1881 -.678 2 1931 .828 13 1981 -.855 22

1832 1.069 1 1882 -1.181 2 1932 .862 14 1982 -.395 22

1833 .647 1 1883 -.722 2 1933 .443 16 1983 -.483 22

1834 2.078 1 1884 -.337 2 1934 .329 17 1984 -.385 22

1835 .853 1 1885 -.141 2 1935 -.414 18 1985 -.307 22

1836 .060 2 1886 .924 2 1936 -.279 19 1986 -1.469 22

1837 .570 2 1887 -.087 2 1937 .796 20 1987 .366 22

1838 -.133 2 1888 -.050 2 1938 .633 21 1988 .225 22

1839 .224 2 1889 .159 2 1939 .482 22 1989 -.629 22

1840 .655 2 1890 .161 2 1940 -1.825 22 1990 .477 22

1841 -1.828 2 1891 .552 2 1941 .461 22 1991 .858 22

1842 -1.109 2 1892 1.491 2 1942 -.119 22 1992 .452 22

1843 -.863 2 1893 .894 2 1943 .120 22 1993 1.013 22

1844 -1.561 2 1894 -.165 2 1944 1.046 22 1994 .299 22

1845 .331 2 1895 -2.476 2 1945 -.295 22 1995 .947 22

1846 -.027 2 1896 -1.391 2 1946 -.433 22 1996 -.806 22

1847 -.148 2 1897 -2.104 2 1947 .708 22 1997 .930 22

1848 .765 2 1898 -.336 2 1948 -1.220 22 1998 .096 22

1849 .308 2 1899 .155 2 1949 .457 22 1999 1.315 22

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PART 4: Master Bar Plot: 15:49 Wed 20 Apr 2011 Page 4

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

1850----@ 1900----------G 1950-d 2000---a

1851------A 1901-----@ 1951----@ 2001---------D

1852----@ 1902--------C 1952------A 2002---------C

1853---a 1903--------C 1953-----A 2003-f

1854--b 1904----------H 1954--------B 2004f

1855---b 1905-------B 1955----------G 2005-e

1856------A 1906---------E 1956--b 2006--c

1857-------B 1907-------B 1957--------C 2007-------B

1858------A 1908---------D 1958---------D 2008------A

1859----------H 1909-f 1959-----@ 2009-----@

1860--------C 1910----@ 1960-----A 2010----------F

1861----------G 1911-e 1961---------E

1862f 1912------A 1962----a

1863----a 1913---------E 1963--b

1864------A 1914--b 1964g

1865-f 1915-d 1965i

1866-d 1916-------B 1966i

1817----------F 1867------A 1917---b 1967-d

1818--b 1868------A 1918h 1968--b

1819--------C 1869-d 1919----a 1969---a

1820i 1870----------F 1920-----@ 1970-------B

1821---------D 1871-e 1921-----A 1971---------E

1822-----@ 1872----@ 1922-------B 1972-------B

1823------A 1873f 1923-------B 1973-----A

1824----@ 1874--c 1924---------D 1974----a

1825----a 1875----@ 1925----a 1975--------C

1826r 1876-e 1926-e 1976------A

1827g 1877----a 1927-e 1977------A

1828-----@ 1878------A 1928--c 1978----@

1829---------D 1879----------J 1929-d 1979----a

1830---------D 1880----------J 1930---a 1980----------E

1831----------F 1881--c 1931--------C 1981--c

1832---------D 1882-e 1932---------C 1982---b

1833--------C 1883--c 1933-------B 1983--b

1834----------H 1884---a 1934------A 1984---b

1835---------C 1885----a 1935---b 1985---a

1836-----@ 1886---------D 1936---a 1986f

1837-------B 1887----@ 1937--------C 1987------A

1838----a 1888----@ 1938--------C 1988------A

1839------A 1889-----A 1939-------B 1989--c

1840--------C 1890-----A 1940g 1990-------B

1841g 1891-------B 1941-------B 1991---------C

1842-d 1892----------F 1942----@ 1992-------B

1843--c 1893---------D 1943-----@ 1993---------D

1844f 1894----a 1944---------D 1994------A

1845------A 1895j 1945---a 1995---------D

1846----@ 1896-f 1946---b 1996--c

1847----a 1897h 1947--------C 1997---------D

1848--------C 1898---a 1948-e 1998-----@

1849------A 1899-----A 1949-------B 1999----------E

PART 5: CORRELATION OF SERIES BY SEGMENTS: 15:49 Wed 20 Apr 2011 Page 5

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Correlations of 30-year dated segments, lagged 15 years

Flags: A = correlation under .4226 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1830 1845 1860 1875 1890 1905 1920 1935 1950 1965 1980 1995

1859 1874 1889 1904 1919 1934 1949 1964 1979 1994 2009 2024

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

1 382A 1936 2010 .72 .73 .72 .78 .79

2 382B 1937 2010 .43B .77 .78 .80 .80

3 383A 1926 2010 .55 .60 .73 .68 .71 .69

4 383B 1932 2010 .48 .51 .73 .57 .66 .62

5 384A 1914 2010 .58 .71 .82 .79 .70 .82 .82

6 384B 1910 2010 .21B .39B .60 .65 .35A .48 .53

7 385A 1939 2010 .70 .63 .63 .80 .83

8 385B 1935 2010 .66 .42A .26B .69 .62

9 386A 1917 2010 .57 .65 .76 .79 .76 .80 .81

10 386B 1917 2010 .83 .85 .84 .70 .64 .78 .78

11 387A 1933 2010 .68 .71 .74 .78 .87 .86

12 387B 1938 2010 .55 .66 .71 .84 .84

13 388A 1927 2010 .73 .79 .83 .68 .80 .80

14 388B 1925 2010 .71 .77 .79 .83 .85 .87

15 389A 1933 2010 .59 .69 .71 .09B .04B .10B

16 389B 1929 2010 .72 .75 .73 .63 .83 .83

17 390A 1923 2010 .55 .84 .85 .54 .66 .66

18 390B 1924 2010 .77 .87 .76 .71 .85 .85

19 391A 1934 2010 .67 .66 .63 .60 .67 .68

20 391B 1924 2010 .75 .72 .77 .83 .86 .85

21 527A 1817 2010 .26B .31A .63 .70 .66 .55 .64 .71 .60 .67 .85 .84

22 527B 1836 2010 .26B .31B .63 .70 .65 .64 .42A .44B .55 .50 .57 .55

Av segment correlation .26 .31 .63 .70 .66 .57 .64 .69 .71 .62 .73 .73

PART 6: POTENTIAL PROBLEMS: 15:49 Wed 20 Apr 2011 Page 5

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

[A] Correlations with master dating series of flagged 30-year segments of series filtered with 32-year spline,

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

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

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

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

[D] Absent rings (zero values)

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

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382A 1936 to 2010 75 years Series 1

[B] Entire series, effect on correlation ( .731) is:

Lower 1936< -.022 1950> -.019 1945> -.016 1984> -.011 1990< -.008 1948> -.008 Higher 1940 .031 1956 .011

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

1950 +3.0 SD

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382B 1937 to 2010 74 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

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

1937 1966 3 .14 -.02 .04 -.32 -.10 .19 -.25 .12 .10 -.32 .43|-.13 .10 .43\*-.22 .14 .02 -.32 .27 -.26 -.20

[B] Entire series, effect on correlation ( .610) is:

Lower 1937< -.063 1938< -.037 1945< -.025 1989> -.017 1940> -.012 1946> -.008 Higher 2003 .040 1996 .013

1937 to 1966 segment:

Lower 1937< -.114 1938< -.064 1945< -.021 1946> -.014 1950> -.013 1940> -.010 Higher 1955 .034 1947 .024

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

1937 -4.6 SD

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383A 1926 to 2010 85 years Series 3

[B] Entire series, effect on correlation ( .593) is:

Lower 1941< -.025 1940> -.020 2010< -.016 2006< -.013 2004> -.013 2007< -.010 Higher 2003 .029 1955 .020

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

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> 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

2005 +3.2 SD

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383B 1932 to 2010 79 years Series 4

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

Lower 1941< -.034 2007< -.034 1984< -.026 1940> -.017 2010< -.015 1945> -.013 Higher 2003 .031 1956 .020

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

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> 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

1964 -4.6 SD

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384A 1914 to 2010 97 years Series 5

[B] Entire series, effect on correlation ( .751) is:

Lower 1918> -.025 1989> -.011 1978< -.008 1988< -.007 1979< -.005 1992> -.005 Higher 2003 .018 1981 .010

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384B 1910 to 2010 101 years Series 6

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

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

1910 1939 -3 .14 .06 .15 .01 -.21 -.05 -.01 .25\* .17 .17 .21| .03 -.34 -.39 .03 -.03 .03 .14 .15 -.23 .14

1920 1949 -3 .05 -.08 .22 -.03 -.16 -.27 -.14 .45\* .26 .07 .39|-.36 .00 -.31 -.29 .25 .05 -.11 .30 -.44 .11

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

1965 1994 0 .26 -.16 -.37 -.26 -.36 -.20 -.36 -.18 .26 -.14 .35\* .06 .09 .27 .11 .16 .14 .18 .28 .05 -.11

[B] Entire series, effect on correlation ( .428) is:

Lower 1918> -.033 1940> -.019 1986> -.014 1915> -.013 1921< -.013 1977< -.012 Higher 1956 .033 1948 .022

1910 to 1939 segment:

Lower 1918> -.082 1921< -.055 1919< -.047 1915> -.036 1930< -.021 1922< -.012 Higher 1913 .054 1931 .039

1920 to 1949 segment:

Lower 1940> -.083 1921< -.053 1939> -.030 1930< -.020 1926> -.020 1942< -.013 Higher 1948 .109 1944 .032

1965 to 1994 segment:

Lower 1986> -.072 1977< -.033 1978< -.024 1985> -.021 1988< -.016 1979< -.016 Higher 1966 .066 1990 .032

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

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

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

1918 +3.8 SD; 1940 +3.4 SD; 1978 -5.5 SD; 1986 +3.4 SD

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385A 1939 to 2010 72 years Series 7

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

Lower 1954< -.018 1959> -.015 1989> -.011 1965> -.011 1957< -.010 1949< -.009 Higher 1940 .027 1981 .015

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385B 1935 to 2010 76 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 1979 0 .06 .17 .35 -.12 .25 -.20 -.20 .10 -.15 -.08 .42\*-.17 -.09 -.14 -.28 -.19 -.04 -.03 .00 .34 .10

1965 1994 9 .20 .19 .24 .15 -.06 -.12 -.40 -.01 -.22 -.31 .26|-.06 .18 -.15 -.10 .09 -.05 .17 .19 .34\* .16

[B] Entire series, effect on correlation ( .582) is:

Lower 1963> -.028 1972< -.026 2010< -.025 1948> -.025 1951< -.016 1982> -.012 Higher 1940 .063 2003 .035

1950 to 1979 segment:

Lower 1963> -.099 1972< -.055 1951< -.033 1971< -.014 1957< -.014 1976< -.013 Higher 1956 .096 1961 .050

1965 to 1994 segment:

Lower 1972< -.062 1982> -.038 1983> -.038 1985> -.026 1971< -.022 1976< -.018 Higher 1965 .081 1980 .034

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

1963 +4.4 SD; 1983 +3.1 SD; 1985 +3.4 SD

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386A 1917 to 2010 94 years Series 9

[B] Entire series, effect on correlation ( .730) is:

Lower 1939< -.019 1945> -.017 1918> -.014 1978< -.012 1926< -.010 2009< -.008 Higher 1940 .023 2003 .015

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386B 1917 to 2010 94 years Series 10

[B] Entire series, effect on correlation ( .760) is:

Lower 1986> -.016 1950> -.013 1975< -.007 1974< -.007 1996> -.005 1925> -.005 Higher 1940 .022 1948 .007

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387A 1933 to 2010 78 years Series 11

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

Lower 1939< -.065 1958< -.016 1984< -.008 1935> -.007 1950> -.007 2007< -.007 Higher 1940 .037 2003 .023

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

2005 -1.352 22 4

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> 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

1940 -5.4 SD

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387B 1938 to 2010 73 years Series 12

[B] Entire series, effect on correlation ( .677) is:

Lower 1939< -.048 1945> -.019 1940> -.018 1956> -.013 1984< -.010 1952< -.010 Higher 2003 .040 1981 .020

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

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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388A 1927 to 2010 84 years Series 13

[B] Entire series, effect on correlation ( .760) is:

Lower 1940> -.025 1983< -.013 1927< -.013 1981> -.011 1972< -.011 1935> -.007 Higher 1956 .015 1948 .009

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388B 1925 to 2010 86 years Series 14

[B] Entire series, effect on correlation ( .799) is:

Lower 1950< -.047 2003> -.008 1998< -.006 1944< -.005 1927> -.004 1979> -.004 Higher 1956 .012 1981 .010

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389A 1933 to 2010 78 years Series 15

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

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

1965 1994 -5 -.21 -.16 -.10 -.01 -.22 .42\* .23 -.06 .11 .15 .09| .16 -.29 .26 -.04 -.39 -.06 -.11 -.10 -.01 .14

1980 2009 -5 .16 -.13 .07 .24 -.27 .28\* .22 -.04 .18 -.16 .04| .00 - - - - - - - - -

1981 2010 -5 .21 -.07 .08 .24 -.29 .32\* .23 -.05 .18 -.16 .10| - - - - - - - - - -

[B] Entire series, effect on correlation ( .329) is:

Lower 1981> -.058 2004> -.030 2003> -.026 1980< -.024 2005< -.018 1984> -.009 Higher 1986 .033 1955 .021

1965 to 1994 segment:

Lower 1981> -.194 1980< -.084 1988< -.027 1984> -.023 1993< -.021 1983> -.008 Higher 1986 .209 1975 .044

1980 to 2009 segment:

Lower 1981> -.110 2004> -.056 1980< -.037 2003> -.035 1984> -.014 1988< -.012 Higher 1986 .107 2001 .061

1981 to 2010 segment:

Lower 1981> -.113 2004> -.057 2003> -.038 1984> -.014 1988< -.013 1993< -.008 Higher 1986 .105 2001 .059

[D] 7 Absent rings: Year Master N series Absent

1966 -2.155 22 2

2005 -1.352 22 4

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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

1940 +3.5 SD; 1981 +3.5 SD; 2003 +3.6 SD; 2004 +4.9 SD

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

389B 1929 to 2010 82 years Series 16

[B] Entire series, effect on correlation ( .767) is:

Lower 1981> -.017 1929< -.016 1945< -.016 1948> -.008 1939> -.008 1978> -.008 Higher 1940 .032 2003 .026

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

1966 -2.155 22 2

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390A 1923 to 2010 88 years Series 17

[B] Entire series, effect on correlation ( .657) is:

Lower 1923< -.049 1926> -.028 1981> -.019 1924< -.015 1982> -.009 1993< -.008 Higher 1940 .043 2003 .027

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

1923 -5.2 SD; 1982 +3.2 SD

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390B 1924 to 2010 87 years Series 18

[B] Entire series, effect on correlation ( .790) is:

Lower 1924< -.022 1956> -.016 1929> -.010 1977< -.009 1989> -.008 1927> -.006 Higher 1940 .025 2003 .022

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391A 1934 to 2010 77 years Series 19

[B] Entire series, effect on correlation ( .666) is:

Lower 1982< -.067 1948> -.029 1954< -.016 1964> -.014 1989> -.014 1960< -.009 Higher 1940 .037 1981 .019

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391B 1924 to 2010 87 years Series 20

[B] Entire series, effect on correlation ( .789) is:

Lower 1956> -.015 1940> -.010 1936> -.008 1982< -.007 1938< -.006 1969< -.006 Higher 1981 .008 1926 .007

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527A 1817 to 2010 194 years Series 21

[\*] Early part of series cannot be checked from 1817 to 1835 -- not matched by another series

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

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1836 1865 8 -.08 -.14 .12 -.38 -.44 -.18 -.45 .12 .00 -.06 .26|-.16 -.03 -.12 .13 -.09 -.04 .08 .36\* .09 .06

1845 1874 0 -.06 .12 -.04 .12 -.24 -.23 -.15 .12 .10 -.12 .31\*-.27 .05 -.21 .11 -.06 -.30 .17 .22 .05 .10

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

Lower 1853> -.018 1847> -.017 1926> -.012 1839< -.010 1883> -.010 1858< -.008 Higher 1940 .021 1895 .014

1836 to 1865 segment:

Lower 1853> -.085 1847> -.082 1839< -.044 1858< -.039 1846> -.022 1854< -.020 Higher 1862 .116 1841 .099

1845 to 1874 segment:

Lower 1853> -.080 1847> -.077 1869< -.043 1858< -.043 1854< -.021 1846> -.020 Higher 1862 .100 1859 .051

[D] 9 Absent rings: Year Master N series Absent

2002 .848 22 1 >> WARNING: Ring is not usually narrow

2003 -1.423 22 1

2004 -1.551 22 1

2005 -1.352 22 4

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 6 3.0 SD above or -4.5 SD below mean for year

1847 +5.2 SD; 1848 +3.4 SD; 1853 +4.9 SD; 1883 +3.7 SD; 1898 +3.3 SD; 1926 +3.8 SD

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527B 1836 to 2010 175 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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1836 1865 -8 .03 -.05 .35\* .06 -.03 .16 .17 -.03 .02 -.19 .26|-.05 -.03 .16 -.18 -.26 -.21 .08 -.04 .12 -.07

1845 1874 -8 .09 .09 .36\* .08 -.10 -.08 .10 -.23 .07 -.28 .31|-.10 .14 .22 -.04 -.21 -.29 .05 -.12 .09 .10

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

1920 1949 0 .23 .14 .35 .12 .04 -.08 -.47 .03 .06 -.07 .42\*-.13 -.01 .01 -.12 .31 -.28 -.15 .01 -.37 .13

1935 1964 -6 .02 .08 .29 -.06 .50\*-.06 -.35 .23 -.05 -.28 .44|-.35 -.05 .06 -.12 .17 -.18 -.22 .00 -.27 .24

[B] Entire series, effect on correlation ( .511) is:

Lower 1940> -.025 1853< -.017 1847< -.016 2004> -.011 1839> -.010 1869> -.010 Higher 1895 .014 1879 .012

1836 to 1865 segment:

Lower 1853< -.085 1847< -.082 1839> -.044 1858> -.039 1846< -.022 1854> -.020 Higher 1862 .116 1841 .099

1845 to 1874 segment:

Lower 1853< -.080 1847< -.077 1869> -.043 1858> -.043 1854> -.021 1846< -.020 Higher 1862 .100 1859 .051

1920 to 1949 segment:

Lower 1940> -.200 1935< -.017 1926> -.017 1939> -.015 1947< -.015 1925< -.005 Higher 1948 .044 1944 .037

1935 to 1964 segment:

Lower 1940> -.158 1952< -.018 1935< -.017 1939> -.015 1964> -.011 1947< -.010 Higher 1961 .043 1956 .040

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

2005 -1.352 22 4

2006 -.772 22 7

2007 .492 22 8 >> WARNING: Ring is not usually narrow

2008 .328 22 7 >> WARNING: Ring is not usually narrow

2009 .106 22 7 >> WARNING: Ring is not usually narrow

2010 1.441 22 7 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 8 3.0 SD above or -4.5 SD below mean for year

1839 +4.0 SD; 1840 +3.5 SD; 1847 -5.2 SD; 1853 -4.9 SD; 1858 +3.8 SD; 1869 +3.6 SD; 1940 +4.8 SD;

2004 +3.8 SD

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PART 7: DESCRIPTIVE STATISTICS: 15:49 Wed 20 Apr 2011 Page 6

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

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1 382A 1936 2010 75 5 0 .731 1.72 4.84 1.236 .927 .228 2.62 .397 .043 1

2 382B 1937 2010 74 5 1 .610 1.59 4.65 1.216 .924 .247 2.63 .496 .006 2

3 383A 1926 2010 85 6 0 .593 .98 3.88 .878 .846 .276 2.77 .421 -.061 1

4 383B 1932 2010 79 6 0 .519 1.11 3.58 .847 .906 .247 2.79 .501 .059 1

5 384A 1914 2010 97 7 0 .751 1.09 3.07 .599 .715 .256 2.74 .423 -.016 1

6 384B 1910 2010 101 7 3 .428 1.57 4.90 .870 .771 .314 2.73 .449 .000 1

7 385A 1939 2010 72 5 0 .732 1.42 3.70 .865 .818 .298 2.59 .483 -.052 4

8 385B 1935 2010 76 5 2 .582 1.66 3.72 .897 .828 .260 2.62 .515 .047 2

9 386A 1917 2010 94 7 0 .730 1.61 3.48 .729 .878 .180 2.62 .486 .013 1

10 386B 1917 2010 94 7 0 .760 1.97 4.08 .927 .895 .175 2.42 .412 -.010 1

11 387A 1933 2010 78 6 0 .747 1.22 3.75 1.055 .897 .332 2.69 .494 .048 1

12 387B 1938 2010 73 5 0 .677 1.01 2.70 .745 .900 .285 2.51 .437 -.061 1

13 388A 1927 2010 84 6 0 .760 1.52 3.44 .825 .901 .222 2.70 .579 -.021 1

14 388B 1925 2010 86 6 0 .799 1.47 3.66 .909 .886 .245 2.62 .441 -.070 1

15 389A 1933 2010 78 6 3 .329 1.11 4.87 1.351 .946 .358 2.67 .429 .016 2

16 389B 1929 2010 82 6 0 .767 1.19 3.65 1.020 .937 .349 2.80 .550 -.032 1

17 390A 1923 2010 88 6 0 .657 1.35 4.05 1.113 .889 .281 2.51 .392 -.004 2

18 390B 1924 2010 87 6 0 .790 1.54 4.02 1.050 .900 .261 2.67 .510 .037 2

19 391A 1934 2010 77 6 0 .666 1.93 5.37 1.239 .877 .232 2.56 .494 .091 2

20 391B 1924 2010 87 6 0 .789 1.96 4.73 1.088 .845 .255 2.63 .525 .017 1

21 527A 1817 2010 194 12 2 .567 1.05 4.09 .886 .948 .238 2.60 .400 -.007 2

22 527B 1836 2010 175 12 4 .511 .93 2.92 .587 .897 .222 2.66 .393 -.083 1

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Total or mean: 2036 143 15 .649 1.37 5.37 .925 .881 .258 2.80 .457 -.006

- = [ COFECHA 86 COF ] = -