[] Dendrochronology Program Library Run 115KI Program COF 13:49 Tue 26 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 27876

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: 115\_KIL-corr3-50

File of DATED series: 115\_KIL\_corr3

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 1816 to 2010 195 years

Continuous time span is 1816 to 2010 195 years

Portion with two or more series is 1823 to 2010 188 years

>> 556-a 1919 absent in 1 of 21 series, but is not usually narrow: master index is .629

>> 556-a 1920 absent in 1 of 22 series, but is not usually narrow: master index is .754

>> 556-a 1921 absent in 1 of 22 series, but is not usually narrow: master index is -.264

>> 556-a 1922 absent in 1 of 22 series, but is not usually narrow: master index is .655

>> 556-a 1923 absent in 1 of 22 series, but is not usually narrow: master index is -.381

>> 556-a 1924 absent in 2 of 22 series, but is not usually narrow: master index is 1.482

>> 556-b 1924 absent in 2 of 22 series, but is not usually narrow: master index is 1.482

>> 556-b 1925 absent in 1 of 22 series, but is not usually narrow: master index is -.389

>> 560-a 1985 absent in 2 of 22 series, but is not usually narrow: master index is .272

>> 560-b 1853 absent in 1 of 6 series, but is not usually narrow: master index is -.158

>> 560-b 1855 absent in 1 of 6 series, but is not usually narrow: master index is .335

>> 560-b 1856 absent in 1 of 6 series, but is not usually narrow: master index is .547

>> 560-b 1857 absent in 1 of 6 series, but is not usually narrow: master index is 1.244

>> 560-b 1858 absent in 1 of 6 series, but is not usually narrow: master index is 1.643

>> 560-b 1859 absent in 1 of 6 series, but is not usually narrow: master index is 1.397

>> 560-b 1860 absent in 1 of 7 series, but is not usually narrow: master index is 1.400

>> 560-b 1861 absent in 1 of 8 series, but is not usually narrow: master index is 1.712

>> 560-b 1863 absent in 1 of 8 series, but is not usually narrow: master index is -.317

>> 562-a 1912 absent in 1 of 18 series, but is not usually narrow: master index is .043

>> 565-a 1980 absent in 1 of 22 series, but is not usually narrow: master index is .943

>> 565-a 1985 absent in 2 of 22 series, but is not usually narrow: master index is .272

>> 565-a 1987 absent in 1 of 22 series, but is not usually narrow: master index is .558

>> 565-a 1988 absent in 2 of 22 series, but is not usually narrow: master index is .777

>> 565-a 1989 absent in 1 of 22 series, but is not usually narrow: master index is .923

>> 565-b 1972 absent in 1 of 22 series, but is not usually narrow: master index is .578

>> 565-b 1988 absent in 2 of 22 series, but is not usually narrow: master index is .777

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

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

\*O\* Master series 1816 2010 195 yrs \*O\*

\*F\* Total rings in all series 2933 \*F\*

\*E\* Total dated rings checked 2926 \*E\*

\*C\* Series intercorrelation .493 \*C\*

\*H\* Average mean sensitivity .249 \*H\*

\*A\* Segments, possible problems 13 \*A\*

\*\*\* Mean length of series 133.3 \*\*\*

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

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

556-a 6 absent rings: 1919 1920 1921 1922 1923 1924

556-b 2 absent rings: 1924 1925

560-a 1 absent rings: 1985

560-b 16 absent rings: 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1982 2003 2004

562-a 1 absent rings: 1912

565-a 12 absent rings: 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989

565-b 4 absent rings: 1972 1981 1982 1988

42 absent rings 1.432%

PART 2: TIME PLOT OF TREE-RING SERIES: 115\_KIL-corr3-50 13:49 Tue 26 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

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

. . . . . . . . . . . . . . . . . <===========> . 555-a 1 1892 2010 119

. . . . . . . . . . . . . . . . . .<=========> . 555-b 2 1914 2010 97

. . . . . . . . . . . . . . . . <==================> . 556-a 3 1827 2010 184

. . . . . . . . . . . . . . . . .<==============> . 556-b 4 1860 2010 151

. . . . . . . . . . . . . . . . . <==========> . 557-a 5 1909 2010 102

. . . . . . . . . . . . . . . . . . <========> . 557-b 6 1920 2010 91

. . . . . . . . . . . . . . . . <================> . 558-a 7 1845 2010 166

. . . . . . . . . . . . . . . . .<==============> . 558-b 8 1861 2010 150

. . . . . . . . . . . . . . . . .<==============> . 559-a 9 1865 2010 146

. . . . . . . . . . . . . . . . <================> . 559-b 10 1843 2010 168

. . . . . . . . . . . . . . . . <===============> . 560-a 11 1850 2010 161

. . . . . . . . . . . . . . . . <==================> . 560-b 12 1823 2010 188

. . . . . . . . . . . . . . . . . <==========> . 561-a 13 1906 2010 105

. . . . . . . . . . . . . . . . . .<=========> . 561-b 14 1916 2010 95

. . . . . . . . . . . . . . . . . <==========> . 562-a 15 1909 2010 102

. . . . . . . . . . . . . . . .<===================> . 562-b 16 1816 2010 195

. . . . . . . . . . . . . . . . . <==========> . 563-a 17 1904 2010 107

. . . . . . . . . . . . . . . . . .<=========> . 563-b 18 1916 2010 95

. . . . . . . . . . . . . . . . . .<=========> . 564-a 19 1910 2010 101

. . . . . . . . . . . . . . . . . <===========> . 564-b 20 1893 2010 118

. . . . . . . . . . . . . . . . .<==============> . 565-a 21 1864 2010 147

. . . . . . . . . . . . . . . . .<==============> . 565-b 22 1866 2010 145

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

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: 115\_KIL-corr3-50 13:49 Tue 26 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 -.330 6 1900 -.045 13 1950 -.915 22 2000 -1.195 22

1851 .254 6 1901 -1.034 13 1951 -.821 22 2001 -.228 22

1852 -.894 6 1 1902 -1.325 13 1952 .746 22 2002 .481 22

1853 -.158 6 1<< 1903 -.268 13 1953 -.085 22 2003 -1.694 22 1

1854 -.445 6 1 1904 .338 14 1954 .439 22 2004 -1.046 22 1

1855 .335 6 1<< 1905 -.084 14 1955 1.423 22 2005 -.570 22

1856 .547 6 1<< 1906 .262 15 1956 -.668 22 2006 -.999 22

1857 1.244 6 1<< 1907 .441 15 1957 1.462 22 2007 1.180 22

1858 1.643 6 1<< 1908 .495 15 1958 2.260 22 2008 .198 22

1859 1.397 6 1<< 1909 -.544 17 1959 .173 22 2009 .792 22

1860 1.400 7 1<< 1910 -.100 18 1960 .514 22 2010 1.804 22

1861 1.712 8 1<< 1911 -1.524 18 1961 1.628 22

1862 -1.430 8 1 1912 .043 18 1<< 1962 -.141 22

1863 -.317 8 1<< 1913 .588 18 1963 .390 22

1864 -1.329 9 1 1914 -1.077 19 1964 -.348 22

1865 -.880 10 1915 -.001 19 1965 -.427 22

1816 -.243 1 1866 -1.058 11 1916 .444 21 1966 -.910 22

1817 2.753 1 1867 .616 11 1917 -.107 21 1967 -1.475 22

1818 .265 1 1868 .557 11 1918 -.799 21 1968 -2.126 22

1819 -.181 1 1869 -.086 11 1919 .629 21 1<< 1969 -1.025 22

1820 -.413 1 1870 1.335 11 1920 .754 22 1<< 1970 .542 22

1821 -.800 1 1871 1.467 11 1921 -.264 22 1<< 1971 .632 22

1822 2.342 1 1872 .809 11 1922 .655 22 1<< 1972 .578 22 1<<

1823 .492 2 1873 -.881 11 1923 -.381 22 1<< 1973 .197 22

1824 .742 2 1874 .180 11 1924 1.482 22 2<< 1974 .177 22

1825 .875 2 1875 .044 11 1925 -.389 22 1<< 1975 .567 22

1826 -1.896 2 1876 -1.142 11 1926 -.121 22 1976 .016 22

1827 .040 3 1877 -.396 11 1927 .243 22 1977 -.194 22

1828 1.205 3 1878 1.374 11 1928 .370 22 1978 -.579 22 1

1829 -1.755 3 1879 -.354 11 1929 -.654 22 1979 -.669 22 1

1830 1.745 3 1880 .857 11 1930 -.380 22 1980 .943 22 1<<

1831 -.482 3 1881 -1.962 11 1931 .033 22 1981 -1.144 22 2

1832 -1.796 3 1882 -.889 11 1932 .238 22 1982 -.621 22 3

1833 -.302 3 1883 -1.254 11 1933 -.691 22 1983 -1.510 22 1

1834 .866 3 1884 -.513 11 1934 1.235 22 1984 -.773 22 1

1835 -.827 3 1885 .588 11 1935 -.361 22 1985 .272 22 2<<

1836 .651 3 1886 1.833 11 1936 -1.442 22 1986 -.536 22 1

1837 -.669 3 1887 -1.097 11 1937 -.425 22 1987 .558 22 1<<

1838 -2.336 3 1888 -.975 11 1938 -.224 22 1988 .777 22 2<<

1839 -1.366 3 1889 -.363 11 1939 1.332 22 1989 .923 22 1<<

1840 2.004 3 1890 .625 11 1940 -1.582 22 1990 1.246 22

1841 .617 3 1891 .406 11 1941 1.469 22 1991 .860 22

1842 1.736 3 1892 .589 12 1942 .149 22 1992 1.492 22

1843 -.767 4 1893 -.579 13 1943 -.867 22 1993 2.162 22

1844 -1.452 4 1894 .902 13 1944 .375 22 1994 1.183 22

1845 .853 5 1895 -.111 13 1945 .271 22 1995 .700 22

1846 -.074 5 1896 .680 13 1946 -.423 22 1996 -1.976 22

1847 -1.885 5 1897 -.639 13 1947 -.186 22 1997 -1.167 22

1848 .421 5 1898 .948 13 1948 -2.488 22 1998 -.675 22

1849 -.546 5 1899 -.149 13 1949 -.744 22 1999 -.039 22

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PART 4: Master Bar Plot: 115\_KIL-corr3-50 13:49 Tue 26 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----a 1900-----@ 1950--d 2000-e

1851------A 1901-d 1951--c 2001----a

1852--d 1902-e 1952--------C 2002-------B

1853-----a 1903----a 1953-----@ 2003g

1854---b 1904------A 1954-------B 2004-d

1855------A 1905-----@ 1955---------F 2005---b

1856-------B 1906------A 1956--c 2006-d

1857---------E 1907-------B 1957---------F 2007---------E

1858----------G 1908-------B 1958----------I 2008------A

1859---------F 1909---b 1959------A 2009--------C

1860---------F 1910-----@ 1960-------B 2010----------G

1861----------G 1911f 1961----------G

1862f 1912-----@ 1962-----a

1863----a 1913-------B 1963------B

1864-e 1914-d 1964----a

1865--d 1915-----@ 1965---b

1816----a 1866-d 1916-------B 1966--d

1817----------K 1867-------B 1917-----@ 1967f

1818------A 1868-------B 1918--c 1968i

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

1820---b 1870---------E 1920--------C 1970-------B

1821--c 1871---------F 1921----a 1971-------C

1822----------I 1872--------C 1922--------C 1972-------B

1823-------B 1873--d 1923---b 1973------A

1824--------C 1874------A 1924----------F 1974------A

1825--------D 1875-----@ 1925---b 1975-------B

1826h 1876-e 1926-----@ 1976-----@

1827-----@ 1877---b 1927------A 1977----a

1828---------E 1878---------E 1928------A 1978---b

1829g 1879----a 1929--c 1979--c

1830----------G 1880--------C 1930---b 1980--------D

1831---b 1881h 1931-----@ 1981-e

1832g 1882--d 1932------A 1982---b

1833----a 1883-e 1933--c 1983f

1834--------C 1884---b 1934---------E 1984--c

1835--c 1885-------B 1935----a 1985------A

1836--------C 1886----------G 1936f 1986---b

1837--c 1887-d 1937---b 1987-------B

1838i 1888-d 1938----a 1988--------C

1839-e 1889----a 1939---------E 1989--------D

1840----------H 1890-------C 1940f 1990---------E

1841-------B 1891-------B 1941---------F 1991--------C

1842----------G 1892-------B 1942------A 1992----------F

1843--c 1893---b 1943--c 1993----------I

1844f 1894--------D 1944------B 1994---------E

1845--------C 1895-----@ 1945------A 1995--------C

1846-----@ 1896--------C 1946---b 1996h

1847h 1897--c 1947----a 1997-e

1848-------B 1898--------D 1948j 1998--c

1849---b 1899-----a 1949--c 1999-----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: 115\_KIL-corr3-50 13:49 Tue 26 Apr 2011 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 1800 1825 1850 1875 1900 1925 1950 1975

1849 1874 1899 1924 1949 1974 1999 2024

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

1 555-a 1892 2010 .26A .28B .39B .63 .57

2 555-b 1914 2010 .35B .30B .47 .53

3 556-a 1827 2010 .33A .56 .39 .49 .63 .78 .78

4 556-b 1860 2010 .63 .52 .25A .44 .61 .57

5 557-a 1909 2010 .40 .33B .56 .65

6 557-b 1920 2010 .46 .33 .48 .44

7 558-a 1845 2010 .46 .47 .45 .50 .57 .52 .50

8 558-b 1861 2010 .56 .50 .68 .67 .64 .71

9 559-a 1865 2010 .45 .49 .47 .59 .45 .19A

10 559-b 1843 2010 .44 .55 .60 .56 .51 .47 .44

11 560-a 1850 2010 .60 .47 .47 .58 .50 .55

12 560-b 1823 2010 .24B .25B .44 .38 .41 .55 .46 .38

13 561-a 1906 2010 .21B .33 .28A .61

14 561-b 1916 2010 .49 .58 .45 .48

15 562-a 1909 2010 .49 .59 .76 .75

16 562-b 1816 2010 .40 .42 .42 .36 .39 .50 .67 .70

17 563-a 1904 2010 .53 .60 .78 .79

18 563-b 1916 2010 .47 .44 .47 .53

19 564-a 1910 2010 .61 .59 .71 .69

20 564-b 1893 2010 .41 .46 .49 .51 .54

21 565-a 1864 2010 .56 .60 .55 .58 .60 .55

22 565-b 1866 2010 .61 .52 .59 .69 .50 .54

Av segment correlation .32 .38 .53 .46 .46 .51 .56 .57

PART 6: POTENTIAL PROBLEMS: 115\_KIL-corr3-50 13:49 Tue 26 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 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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555-a 1892 to 2010 119 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

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1892 1941 0 -.04 -.24 .12 .19 -.14 -.20 .10 -.01 -.12 -.16 .26\*-.13 .03 .23 .03 .01 -.09 .13 -.13 .00 -.19

1900 1949 -3 .07 -.28 .28 .11 -.16 -.05 -.07 .33\*-.42 .01 .28|-.23 -.02 .18 -.01 .27 -.24 .17 -.05 -.09 -.04

1925 1974 -3 -.05 -.36 .31 -.12 .00 .02 -.19 .41\*-.23 -.05 .39|-.20 -.04 .29 -.13 .28 -.03 .03 -.12 -.22 .11

[B] Entire series, effect on correlation ( .442) is:

Lower 1900< -.014 1942> -.013 1981> -.013 1923> -.013 1936> -.011 1922< -.010 Higher 1996 .045 1914 .018

1892 to 1941 segment:

Lower 1900< -.033 1923> -.032 1922< -.024 1936> -.023 1931< -.021 1893> -.019 Higher 1914 .072 1933 .017

1900 to 1949 segment:

Lower 1900< -.030 1923> -.025 1942> -.024 1922< -.022 1936> -.021 1931< -.019 Higher 1914 .054 1943 .025

1925 to 1974 segment:

Lower 1942> -.030 1936> -.023 1971< -.021 1931< -.021 1948> -.013 1932< -.009 Higher 1958 .038 1956 .025

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555-b 1914 to 2010 97 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

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1914 1963 -3 -.25 -.30 .32 -.13 -.11 .04 -.17 .36\*-.23 -.09 .35|-.05 -.04 .21 -.05 .16 -.16 -.03 -.02 .02 -.28

1925 1974 -8 -.10 -.31 .32\*-.09 -.13 .10 -.13 .17 -.23 -.12 .30|-.05 .09 .22 -.12 .28 -.17 -.03 -.13 .06 -.19

[B] Entire series, effect on correlation ( .435) is:

Lower 1968> -.037 1922< -.023 1951< -.018 1972< -.017 1961< -.017 1934< -.016 Higher 1996 .030 1914 .016

1914 to 1963 segment:

Lower 1922< -.037 1961< -.028 1934< -.027 1951< -.021 1923> -.020 1918> -.018 Higher 1914 .032 1958 .029

1925 to 1974 segment:

Lower 1968> -.064 1972< -.028 1961< -.026 1934< -.025 1940> -.019 1951< -.019 Higher 1958 .036 1941 .030

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

1968 +3.0 SD

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556-a 1827 to 2010 184 years Series 3

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

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

1827 1876 0 -.11 .11 .02 -.24 .28 -.13 -.07 .09 -.28 .16 .33\*-.07 .13 .10 -.14 .07 .07 -.16 -.01 -.13 -.28

[B] Entire series, effect on correlation ( .465) is:

Lower 1829> -.046 1897< -.040 1830< -.027 1831> -.015 1914> -.014 1919< -.010 Higher 1996 .015 1862 .015

1827 to 1876 segment:

Lower 1829> -.112 1830< -.068 1831> -.031 1844< -.018 1834< -.014 1849> -.009 Higher 1862 .055 1840 .037

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

1829 1830 -6.0 SD 1896 1897 -4.1 SD

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

1919 .629 21 1 >> WARNING: Ring is not usually narrow

1920 .754 22 1 >> WARNING: Ring is not usually narrow

1921 -.264 22 1 >> WARNING: Ring is not usually narrow

1922 .655 22 1 >> WARNING: Ring is not usually narrow

1923 -.381 22 1 >> WARNING: Ring is not usually narrow

1924 1.482 22 2 >> WARNING: Ring is not usually narrow

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

1829 +4.5 SD; 1897 -6.4 SD

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556-b 1860 to 2010 151 years Series 4

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

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

1900 1949 0 -.17 .10 -.03 -.06 .03 -.02 -.21 -.10 .10 -.05 .25\*-.20 .02 -.11 -.04 -.11 .10 -.05 -.07 .00 .19

[B] Entire series, effect on correlation ( .484) is:

Lower 1924< -.036 1914> -.020 1919< -.017 1940> -.013 1873> -.011 1969< -.011 Higher 1881 .024 1996 .012

1900 to 1949 segment:

Lower 1924< -.116 1919< -.053 1914> -.053 1935> -.022 1920< -.019 1940> -.017 Higher 1941 .057 1939 .053

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

1924 1.482 22 2 >> WARNING: Ring is not usually narrow

1925 -.389 22 1 >> WARNING: Ring is not usually narrow

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557-a 1909 to 2010 102 years Series 5

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

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1925 1974 3 -.16 -.10 .14 -.18 -.02 .02 -.04 -.06 -.01 .05 .33|-.01 -.04 .34\* .03 .08 .00 -.22 -.02 .01 -.30

[B] Entire series, effect on correlation ( .509) is:

Lower 1925> -.027 1931< -.026 1956> -.021 1920< -.016 1973< -.012 1936> -.012 Higher 1996 .032 1948 .021

1925 to 1974 segment:

Lower 1931< -.055 1925> -.048 1956> -.035 1973< -.025 1926< -.022 1932< -.019 Higher 1948 .067 1958 .042

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557-b 1920 to 2010 91 years Series 6

[B] Entire series, effect on correlation ( .421) is:

Lower 1973< -.043 1925> -.028 1939< -.017 1978> -.013 1940> -.013 1931< -.010 Higher 1958 .023 1957 .017

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558-a 1845 to 2010 166 years Series 7

[B] Entire series, effect on correlation ( .479) is:

Lower 1960< -.027 1918< -.022 1869< -.016 1939< -.011 2004> -.007 1911> -.007 Higher 1996 .023 1940 .021

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

1880 +3.2 SD

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558-b 1861 to 2010 150 years Series 8

[B] Entire series, effect on correlation ( .645) is:

Lower 1887> -.033 1888> -.008 1915< -.008 1959> -.008 1943> -.007 1992< -.006 Higher 1996 .020 1881 .012

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559-a 1865 to 2010 146 years Series 9

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

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

1961 2010 0 -.13 .06 -.17 -.12 -.15 -.08 -.16 -.05 .16 .06 .19\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .408) is:

Lower 1941< -.017 1943> -.017 1914> -.014 2004> -.011 2002< -.011 2010< -.011 Higher 1948 .032 1940 .015

1961 to 2010 segment:

Lower 2004> -.032 2006> -.032 2002< -.031 2010< -.028 1999< -.026 1975< -.026 Higher 1961 .039 1993 .039

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

2004 +3.1 SD

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559-b 1843 to 2010 168 years Series 10

[B] Entire series, effect on correlation ( .494) is:

Lower 1855< -.012 1967> -.012 1941< -.011 1844> -.011 1847> -.011 1956> -.009 Higher 1940 .024 1887 .018

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560-a 1850 to 2010 161 years Series 11

[B] Entire series, effect on correlation ( .487) is:

Lower 1985< -.034 1914> -.024 1850< -.013 1925> -.012 1981> -.011 1897> -.009 Higher 1940 .023 1862 .019

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

1984 1985 -4.1 SD

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

1985 .272 22 2 >> WARNING: Ring is not usually narrow

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

1940 -4.6 SD

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560-b 1823 to 2010 188 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

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

1823 1872 6 - - - -.23 .01 .21 -.12 .27 -.10 -.25 .24|-.22 .00 .31 .01 -.14 .39\*-.09 .09 .14 .05

1825 1874 6 - .03 .01 -.29 .06 .19 -.14 .24 -.14 -.20 .25|-.23 .05 .27 -.03 -.09 .37\*-.02 .10 .12 .04

[B] Entire series, effect on correlation ( .362) is:

Lower 1826> -.030 1829< -.023 1865> -.011 1985< -.010 1823< -.008 1914> -.006 Higher 1940 .025 2003 .024

1823 to 1872 segment:

Lower 1826> -.070 1829< -.057 1865> -.029 1823< -.020 1849> -.012 1828< -.011 Higher 1840 .050 1832 .029

1825 to 1874 segment:

Lower 1826> -.070 1829< -.063 1865> -.028 1849> -.011 1828< -.011 1861< -.009 Higher 1840 .050 1832 .028

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

1825 1826 4.1 SD 1829 1830 4.5 SD

[D] 16 Absent rings: Year Master N series Absent

1852 -.894 6 1

1853 -.158 6 1 >> WARNING: Ring is not usually narrow

1854 -.445 6 1

1855 .335 6 1 >> WARNING: Ring is not usually narrow

1856 .547 6 1 >> WARNING: Ring is not usually narrow

1857 1.244 6 1 >> WARNING: Ring is not usually narrow

1858 1.643 6 1 >> WARNING: Ring is not usually narrow

1859 1.397 6 1 >> WARNING: Ring is not usually narrow

1860 1.400 7 1 >> WARNING: Ring is not usually narrow

1861 1.712 8 1 >> WARNING: Ring is not usually narrow

1862 -1.430 8 1

1863 -.317 8 1 >> WARNING: Ring is not usually narrow

1864 -1.329 9 1

1982 -.621 22 3

2003 -1.694 22 1

2004 -1.046 22 1

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

1826 +4.9 SD; 1829 -5.6 SD

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561-a 1906 to 2010 105 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

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1906 1955 -10 .27\*-.21 .12 .09 .10 -.02 -.04 -.12 .07 -.27 .21| .02 .03 .04 -.10 -.05 .06 -.10 .10 -.05 -.10

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

1950 1999 0 .01 .13 .04 -.08 .13 -.20 .10 -.10 .08 .11 .28\* .03 .08 -.27 -.03 .03 .05 -.13 -.09 -.12 .15

[B] Entire series, effect on correlation ( .381) is:

Lower 1954< -.049 1958< -.020 1951> -.020 1990< -.019 1907< -.015 1924< -.012 Higher 2003 .043 1948 .033

1906 to 1955 segment:

Lower 1954< -.092 1951> -.036 1907< -.028 1914> -.021 1924< -.020 1922< -.019 Higher 1948 .093 1941 .047

1950 to 1999 segment:

Lower 1954< -.097 1951> -.043 1958< -.041 1990< -.037 1956> -.022 1985< -.018 Higher 1996 .062 1968 .059

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561-b 1916 to 2010 95 years Series 14

[B] Entire series, effect on correlation ( .474) is:

Lower 1921< -.044 1994< -.031 1936> -.025 2006> -.022 1958< -.017 1925> -.015 Higher 1948 .040 1940 .029

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562-a 1909 to 2010 102 years Series 15

[B] Entire series, effect on correlation ( .572) is:

Lower 1925< -.046 1909> -.019 1918> -.012 1935> -.011 1923> -.011 1926< -.009 Higher 1948 .032 1940 .016

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

1912 .043 18 1 >> WARNING: Ring is not usually narrow

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

1926 -4.8 SD

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

562-b 1816 to 2010 195 years Series 16

[\*] Early part of series cannot be checked from 1816 to 1822 -- not matched by another series

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

Lower 1925< -.033 1826< -.023 1833< -.012 1853< -.009 1897> -.009 1823> -.009 Higher 1996 .013 1940 .012

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

1826 -4.9 SD

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

563-a 1904 to 2010 107 years Series 17

[B] Entire series, effect on correlation ( .643) is:

Lower 1925> -.023 1937< -.018 1940> -.011 1929> -.010 1936< -.010 1908< -.009 Higher 1996 .019 1914 .013

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563-b 1916 to 2010 95 years Series 18

[B] Entire series, effect on correlation ( .492) is:

Lower 1978< -.033 1973< -.022 1940> -.015 1937< -.014 1930< -.011 1925> -.011 Higher 1996 .025 2003 .023

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

564-a 1910 to 2010 101 years Series 19

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

Lower 1940> -.040 1970< -.014 1925> -.012 2005> -.010 1982> -.009 1921< -.007 Higher 1996 .024 2003 .012

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

564-b 1893 to 2010 118 years Series 20

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

Lower 2000> -.020 1897> -.017 1915< -.014 1901> -.012 1951> -.010 1978> -.010 Higher 2003 .026 1996 .015

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

565-a 1864 to 2010 147 years Series 21

[B] Entire series, effect on correlation ( .544) is:

Lower 1942< -.021 1886< -.013 1977> -.011 1981> -.011 1939< -.008 1989< -.008 Higher 1940 .020 1887 .020

[D] 12 Absent rings: Year Master N series Absent

1978 -.579 22 1

1979 -.669 22 1

1980 .943 22 1 >> WARNING: Ring is not usually narrow

1981 -1.144 22 2

1982 -.621 22 3

1983 -1.510 22 1

1984 -.773 22 1

1985 .272 22 2 >> WARNING: Ring is not usually narrow

1986 -.536 22 1

1987 .558 22 1 >> WARNING: Ring is not usually narrow

1988 .777 22 2 >> WARNING: Ring is not usually narrow

1989 .923 22 1 >> WARNING: Ring is not usually narrow

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

1977 +3.3 SD

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565-b 1866 to 2010 145 years Series 22

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

Lower 1918< -.040 1988< -.015 1983> -.011 1996> -.009 1976> -.007 1959> -.007 Higher 1948 .022 1941 .011

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

1972 .578 22 1 >> WARNING: Ring is not usually narrow

1981 -1.144 22 2

1982 -.621 22 3

1988 .777 22 2 >> WARNING: Ring is not usually narrow

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

1918 -6.0 SD

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

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

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

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

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

1 555-a 1892 2010 119 5 3 .442 1.84 5.44 1.037 .770 .283 2.64 .463 .014 1

2 555-b 1914 2010 97 4 2 .435 1.71 4.38 .917 .748 .276 2.84 .541 -.063 1

3 556-a 1827 2010 184 7 1 .465 1.14 4.67 .976 .894 .274 2.65 .351 -.042 1

4 556-b 1860 2010 151 6 1 .484 1.22 4.66 1.058 .866 .301 2.75 .525 .087 2

5 557-a 1909 2010 102 4 1 .509 1.16 3.23 .628 .900 .209 2.56 .444 -.023 2

6 557-b 1920 2010 91 4 0 .421 1.14 3.40 .603 .884 .188 2.56 .343 -.106 1

7 558-a 1845 2010 166 7 0 .479 1.15 2.72 .544 .877 .164 2.79 .394 -.019 1

8 558-b 1861 2010 150 6 0 .645 1.53 3.88 .764 .854 .194 2.75 .434 .017 2

9 559-a 1865 2010 146 6 1 .408 1.33 3.58 .789 .871 .214 2.60 .396 -.055 1

10 559-b 1843 2010 168 7 0 .494 1.09 2.66 .558 .884 .181 2.56 .388 -.053 1

11 560-a 1850 2010 161 6 0 .487 1.03 4.62 1.178 .941 .292 2.59 .331 -.035 2

12 560-b 1823 2010 188 8 2 .362 1.09 4.74 1.326 .946 .336 2.72 .430 -.014 2

13 561-a 1906 2010 105 4 2 .381 1.55 5.10 1.102 .834 .291 2.65 .440 -.036 1

14 561-b 1916 2010 95 4 0 .474 2.08 4.63 .937 .787 .227 2.61 .416 -.083 1

15 562-a 1909 2010 102 4 0 .572 2.02 4.82 1.072 .837 .300 2.50 .360 .002 1

16 562-b 1816 2010 195 8 0 .473 .88 3.94 .808 .857 .299 2.57 .298 -.046 1

17 563-a 1904 2010 107 4 0 .643 1.93 4.55 1.073 .896 .198 2.64 .465 .095 1

18 563-b 1916 2010 95 4 0 .492 1.89 3.82 .759 .851 .188 2.69 .491 .049 1

19 564-a 1910 2010 101 4 0 .644 1.53 3.43 .712 .816 .219 2.72 .546 -.049 1

20 564-b 1893 2010 118 5 0 .469 2.01 3.93 .815 .755 .233 2.55 .451 -.004 1

21 565-a 1864 2010 147 6 0 .544 1.09 2.16 .662 .908 .208 2.76 .488 -.029 1

22 565-b 1866 2010 145 6 0 .582 1.02 2.52 .621 .895 .327 2.71 .381 -.037 1

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Total or mean: 2933 119 13 .493 1.36 5.44 .865 .865 .249 2.84 .419 -.019

- = [ COFECHA 115KICOF ] = -