[] Dendrochronology Program Library Run TSCA Program COF 09:37 Fri 04 Jan 2019 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30686

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: GIWO\_TSCA\_corr2-50

File of DATED series: GIWO\_TSCA\_corr2.txt

CONTENTS:

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

Part 2: Histogram of time spans

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

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

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

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

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

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

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .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 1804 to 2010 207 years

Continuous time span is 1804 to 2010 207 years

Portion with two or more series is 1811 to 2010 200 years

>> 10A 1902 absent in 1 of 11 series, but is not usually narrow: master index is .098

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

\*C\* Number of dated series 38 \*C\*

\*O\* Master series 1804 2010 207 yrs \*O\*

\*F\* Total rings in all series 3683 \*F\*

\*E\* Total dated rings checked 3676 \*E\*

\*C\* Series intercorrelation .550 \*C\*

\*H\* Average mean sensitivity .283 \*H\*

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

\*\*\* Mean length of series 96.9 \*\*\*

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

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

01B 1 absent rings: 1918

10A 6 absent rings: 1901 1902 1908 1909 1918 1950

15B 1 absent rings: 1950

19A 1 absent rings: 1901

21A 1 absent rings: 2006

10 absent rings .272%

PART 2: TIME PLOT OF TREE-RING SERIES: GIWO\_TSCA\_corr2-50 09:37 Fri 04 Jan 2019 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

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

. . . . . . . . . . . . . . . . . <=============> . 01A 1 1872 2010 139

. . . . . . . . . . . . . . . . .<==============> . 01B 2 1862 2010 149

. . . . . . . . . . . . . . . . <===============> . 02A 3 1859 2010 152

. . . . . . . . . . . . . . . . . <==========> . 02B 4 1906 2010 105

. . . . . . . . . . . . . . . . . . <========> . 03A 5 1925 2010 86

. . . . . . . . . . . . . . . . . . <======> . 03B 6 1947 2010 64

. . . . . . . . . . . . . . . . . . <======> . 05A 7 1943 2010 68

. . . . . . . . . . . . . . . . . . .<====> . 05C 8 1966 2010 45

. . . . . . . . . . . . . . . . . . <=====> . 06A 9 1952 2010 59

. . . . . . . . . . . . . . . . . . . <===> . 06B 10 1977 2010 34

. . . . . . . . . . . . . . . .<===================> . 07A 11 1811 2010 200

. . . . . . . . . . . . . . . . . . <========> . 07B 12 1928 2010 83

. . . . . . . . . . . . . . . . . . <=====> . 08A 13 1950 2010 61

. . . . . . . . . . . . . . . . . . <======> . 09A 14 1943 2010 68

. . . . . . . . . . . . . . . . <=================> . 09B 15 1831 2010 180

. . . . . . . . . . . . . . . <====================> . 10A 16 1804 2010 207

. . . . . . . . . . . . . . . . . . .<====> . 10B 17 1968 2010 43

. . . . . . . . . . . . . . . . . . <========> . 11A 18 1928 2010 83

. . . . . . . . . . . . . . . . . . <=======> . 11B 19 1939 2010 72

. . . . . . . . . . . . . . . . . . <=======> . 12A 20 1939 2010 72

. . . . . . . . . . . . . . . . . . <========> . 12B 21 1923 2010 88

. . . . . . . . . . . . . . . . . <============> . 13A 22 1881 2010 130

. . . . . . . . . . . . . . . . . <==========> . 13B 23 1903 2010 108

. . . . . . . . . . . . . . . . . . <=====> . 14A 24 1955 2010 56

. . . . . . . . . . . . . . . . . <==========> . 14B 25 1909 2010 102

. . . . . . . . . . . . . . . . . . <======> . 15A 26 1944 2010 67

. . . . . . . . . . . . . . . . . . <========> . 15B 27 1926 2010 85

. . . . . . . . . . . . . . . . . . <======> . 16A 28 1947 2010 64

. . . . . . . . . . . . . . . . . <===========> . 16B 29 1899 2010 112

. . . . . . . . . . . . . . . . . . <=======> . 17A 30 1930 2010 81

. . . . . . . . . . . . . . . . . . <=======> . 17B 31 1932 2010 79

. . . . . . . . . . . . . . . . . .<=========> . 18A 32 1914 2010 97

. . . . . . . . . . . . . . . . . . <======> . 18B 33 1942 2010 69

. . . . . . . . . . . . . . . . . <============> . 19A 34 1882 2010 129

. . . . . . . . . . . . . . . . . .<=========> . 19B 35 1917 2010 94

. . . . . . . . . . . . . . . . <===============> . 20A 36 1859 2010 152

. . . . . . . . . . . . . . . . . <=============> . 20B 37 1879 2010 132

. . . . . . . . . . . . . . . . . . <======> . 21A 38 1943 2010 68

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

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: GIWO\_TSCA\_corr2-50 09:37 Fri 04 Jan 2019 Page 3

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

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

1850 -.471 3 1900 -1.324 11 1950 -1.597 33 2 2000 -.745 38

1851 .502 3 1901 -1.605 11 2 1951 .078 33 2001 .293 38

1852 -1.733 3 1902 .098 11 1<< 1952 -.021 34 2002 -.663 38

1853 1.136 3 1903 1.280 12 1953 .394 34 2003 -1.170 38

1804 -1.789 1 1854 -.173 3 1904 .882 12 1954 .735 34 2004 -.601 38

1805 -1.175 1 1855 1.088 3 1905 .741 12 1955 1.005 35 2005 -.103 38

1806 -1.236 1 1856 .969 3 1906 .044 13 1956 .152 35 2006 -1.877 38 1

1807 1.306 1 1857 .987 3 1907 -.307 13 1957 1.900 35 2007 -.006 38

1808 2.224 1 1858 .193 3 1908 -1.860 13 1 1958 1.016 35 2008 .121 38

1809 1.280 1 1859 -1.101 5 1909 -1.042 14 1 1959 -.471 35 2009 -.371 38

1810 1.147 1 1860 .855 5 1910 .613 14 1960 -.988 35 2010 1.379 38

1811 1.556 2 1861 1.138 5 1911 -1.196 14 1961 1.199 35

1812 -.656 2 1862 -1.608 6 1912 .809 14 1962 -1.909 35

1813 -1.191 2 1863 -.620 6 1913 1.717 14 1963 -1.049 35

1814 .135 2 1864 -.475 6 1914 1.112 15 1964 -1.216 35

1815 -.380 2 1865 .479 6 1915 .753 15 1965 -.296 35

1816 .417 2 1866 .729 6 1916 .820 15 1966 .559 36

1817 -.679 2 1867 1.460 6 1917 -1.527 16 1967 .816 36

1818 .320 2 1868 .798 6 1918 -2.043 16 2 1968 .599 37

1819 1.631 2 1869 -.496 6 1919 -.093 16 1969 -.207 37

1820 1.522 2 1870 -.655 6 1920 .113 16 1970 -.549 37

1821 -.190 2 1871 -.021 6 1921 .350 16 1971 -.131 37

1822 -1.260 2 1872 -1.307 7 1922 .591 16 1972 -.929 37

1823 1.029 2 1873 -.858 7 1923 .323 17 1973 1.025 37

1824 1.556 2 1874 .002 7 1924 .611 17 1974 -.108 37

1825 .475 2 1875 -.640 7 1925 .292 18 1975 -.538 37

1826 -2.096 2 1876 -1.556 7 1926 -.383 19 1976 -.556 37

1827 -1.629 2 1877 -.870 7 1927 .721 19 1977 -.434 38

1828 -.335 2 1878 1.234 7 1928 -.029 21 1978 -.247 38

1829 -.631 2 1879 .168 8 1929 .261 21 1979 -.147 38

1830 1.609 2 1880 1.263 8 1930 -.667 22 1980 .156 38

1831 1.061 3 1881 .848 9 1931 -.607 22 1981 -1.859 38

1832 .867 3 1882 1.917 10 1932 .211 23 1982 -1.026 38

1833 1.395 3 1883 -.778 10 1933 -.356 23 1983 .461 38

1834 1.680 3 1884 .321 10 1934 -.561 23 1984 -.989 38

1835 .210 3 1885 -.389 10 1935 .327 23 1985 .383 38

1836 .225 3 1886 1.747 10 1936 1.599 23 1986 .519 38

1837 .036 3 1887 -.684 10 1937 .050 23 1987 1.095 38

1838 -.681 3 1888 .029 10 1938 .574 23 1988 .865 38

1839 -1.241 3 1889 -.651 10 1939 .170 25 1989 -.923 38

1840 -2.662 3 1890 -.129 10 1940 .070 25 1990 .748 38

1841 -2.540 3 1891 -.612 10 1941 -.252 25 1991 .553 38

1842 -1.379 3 1892 -.434 10 1942 -.436 26 1992 1.256 38

1843 -1.182 3 1893 -1.172 10 1943 -.759 29 1993 1.568 38

1844 -1.365 3 1894 .385 10 1944 -1.578 30 1994 -.645 38

1845 .835 3 1895 .352 10 1945 .366 30 1995 .799 38

1846 .780 3 1896 .619 10 1946 .660 30 1996 -.358 38

1847 -.791 3 1897 .854 10 1947 1.109 32 1997 .370 38

1848 .909 3 1898 2.112 10 1948 -1.722 32 1998 -.372 38

1849 .404 3 1899 -1.596 11 1949 .324 32 1999 1.142 38

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PART 4: Master Bar Plot: GIWO\_TSCA\_corr2-50 09:37 Fri 04 Jan 2019 Page 4

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

1850---b 1900-e 1950f 2000--c

1851-------B 1901f 1951-----@ 2001------A

1852g 1902-----@ 1952-----@ 2002--c

1853---------E 1903---------E 1953------B 2003-e

1804g 1854----a 1904--------D 1954--------C 2004--b

1805-e 1855---------D 1905--------C 1955---------D 2005----@

1806-e 1856--------D 1906-----@ 1956-----A 2006h

1807---------E 1857---------D 1907----a 1957----------H 2007-----@

1808----------I 1858-----A 1908g 1958---------D 2008-----@

1809---------E 1859-d 1909-d 1959---b 2009---a

1810---------E 1860--------C 1910-------B 1960-d 2010----------F

1811----------F 1861---------E 1911-e 1961---------E

1812--c 1862f 1912--------C 1962h

1813-e 1863--b 1913----------G 1963-d

1814-----A 1864---b 1914---------D 1964-e

1815---b 1865-------B 1915--------C 1965----a

1816------B 1866--------C 1916--------C 1966-------B

1817--c 1867----------F 1917f 1967--------C

1818------A 1868--------C 1918h 1968-------B

1819----------G 1869---b 1919----@ 1969----a

1820----------F 1870--c 1920-----@ 1970---b

1821----a 1871-----@ 1921------A 1971----a

1822-e 1872-e 1922-------B 1972--d

1823---------D 1873--c 1923------A 1973---------D

1824----------F 1874-----@ 1924-------B 1974----@

1825-------B 1875--c 1925------A 1975---b

1826h 1876f 1926---b 1976---b

1827g 1877--c 1927--------C 1977---b

1828----a 1878---------E 1928-----@ 1978----a

1829--c 1879-----A 1929------A 1979----a

1830----------F 1880---------E 1930--c 1980-----A

1831---------D 1881--------C 1931--b 1981g

1832--------C 1882----------H 1932------A 1982-d

1833----------F 1883--c 1933---a 1983-------B

1834----------G 1884------A 1934---b 1984-d

1835------A 1885---b 1935------A 1985------B

1836------A 1886----------G 1936----------F 1986-------B

1837-----@ 1887--c 1937-----@ 1987---------D

1838--c 1888-----@ 1938-------B 1988--------C

1839-e 1889--c 1939-----A 1989--d

1840k 1890----a 1940-----@ 1990--------C

1841j 1891--b 1941----a 1991-------B

1842-f 1892---b 1942---b 1992---------E

1843-e 1893-e 1943--c 1993----------F

1844-e 1894------B 1944f 1994--c

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

1846--------C 1896-------B 1946-------C 1996---a

1847--c 1897--------C 1947---------D 1997------A

1848--------D 1898----------H 1948g 1998---a

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

PART 5: CORRELATION OF SERIES BY SEGMENTS: GIWO\_TSCA\_corr2-50 09:37 Fri 04 Jan 2019 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 01A 1872 2010 .59 .60 .61 .65 .66 .54

2 01B 1862 2010 .78 .72 .58 .51 .44 .38

3 02A 1859 2010 .79 .84 .53 .49 .54 .29A

4 02B 1906 2010 .49 .60 .57 .48

5 03A 1925 2010 .47 .49 .48

6 03B 1947 2010 .54 .47 .50

7 05A 1943 2010 .62 .67 .70

8 05C 1966 2010 .41

9 06A 1952 2010 .63 .61

10 06B 1977 2010 .38

11 07A 1811 2010 .44 .43 .36 .62 .73 .55 .58 .59

12 07B 1928 2010 .51 .54 .50

13 08A 1950 2010 .57 .55

14 09A 1943 2010 .68 .67 .64

15 09B 1831 2010 .64 .56 .57 .51 .47 .64 .63

16 10A 1804 2010 .44 .35 .48 .65 .38 .53 .51 .52

17 10B 1968 2010 .53

18 11A 1928 2010 .68 .65 .54

19 11B 1939 2010 .43 .35 .32A

20 12A 1939 2010 .62 .76 .66

21 12B 1923 2010 .39 .39 .46 .60

22 13A 1881 2010 .54 .63 .57 .57 .57

23 13B 1903 2010 .39 .59 .58 .58

24 14A 1955 2010 .60 .45

25 14B 1909 2010 .45 .39 .54 .46

26 15A 1944 2010 .36 .56 .60

27 15B 1926 2010 .35 .57 .66

28 16A 1947 2010 .65 .61 .54

29 16B 1899 2010 .49 .48 .52 .62 .58

30 17A 1930 2010 .46 .39 .40

31 17B 1932 2010 .53 .63 .56

32 18A 1914 2010 .75 .63 .63 .63

33 18B 1942 2010 .67 .64 .60

34 19A 1882 2010 .60 .62 .68 .60 .55

35 19B 1917 2010 .47 .55 .64 .67

36 20A 1859 2010 .70 .80 .64 .67 .75 .66

37 20B 1879 2010 .75 .53 .61 .79 .76

38 21A 1943 2010 .59 .57 .54

Av segment correlation .44 .47 .61 .65 .54 .55 .58 .55

PART 6: POTENTIAL PROBLEMS: GIWO\_TSCA\_corr2-50 09:37 Fri 04 Jan 2019 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

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

01A 1872 to 2010 139 years Series 1

[B] Entire series, effect on correlation ( .581) is:

Lower 1882< -.015 2000> -.010 2009> -.010 1972> -.009 1935< -.008 1875> -.006 Higher 1948 .025 1899 .016

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

1948 -4.5 SD

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

01B 1862 to 2010 149 years Series 2

[B] Entire series, effect on correlation ( .541) is:

Lower 2003< -.020 1981> -.018 1977< -.017 1955< -.016 1924< -.015 2010< -.014 Higher 1899 .014 1862 .012

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

1918 -2.043 16 2

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

1977 -5.6 SD; 2003 -5.5 SD

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

02A 1859 to 2010 152 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

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

1961 2010 0 .05 -.08 -.27 .14 -.04 -.15 -.14 -.01 -.17 .06 .29\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .537) is:

Lower 2007< -.035 1948> -.013 2001< -.013 1943> -.012 1981> -.010 1989> -.009 Higher 1899 .022 1917 .013

1961 to 2010 segment:

Lower 2007< -.104 2001< -.038 1995< -.024 1989> -.023 1981> -.021 2005> -.017 Higher 1962 .072 1983 .020

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

2006 2007 -4.1 SD

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

1943 +3.1 SD; 2005 +3.3 SD

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

02B 1906 to 2010 105 years Series 4

[B] Entire series, effect on correlation ( .504) is:

Lower 1924< -.065 1981> -.024 1948> -.021 1999< -.016 1915< -.015 2006> -.010 Higher 1917 .026 1950 .021

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

03A 1925 to 2010 86 years Series 5

[B] Entire series, effect on correlation ( .536) is:

Lower 1962> -.036 1930> -.028 1989> -.024 1980< -.015 1935< -.013 1964> -.013 Higher 1948 .033 2006 .023

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

1930 +3.0 SD

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

03B 1947 to 2010 64 years Series 6

[B] Entire series, effect on correlation ( .583) is:

Lower 1961< -.061 1995< -.023 1981> -.022 1952< -.014 1989> -.012 1973< -.012 Higher 1948 .052 1950 .016

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05A 1943 to 2010 68 years Series 7

[B] Entire series, effect on correlation ( .651) is:

Lower 1985< -.046 1945< -.024 1943> -.024 1950> -.013 1944> -.011 1990< -.009 Higher 1962 .054 1948 .045

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05C 1966 to 2010 45 years Series 8

[B] Entire series, effect on correlation ( .406) is:

Lower 1985< -.178 1986< -.026 1967< -.020 1966< -.013 2007< -.010 2003> -.010 Higher 2006 .065 1984 .037

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06A 1952 to 2010 59 years Series 9

[B] Entire series, effect on correlation ( .587) is:

Lower 2003> -.037 1987< -.030 1952< -.029 1994> -.020 1998< -.017 1989> -.017 Higher 1962 .093 1981 .043

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

2003 +3.0 SD

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06B 1977 to 2010 34 years Series 10

[B] Entire series, effect on correlation ( .380) is:

Lower 1994> -.073 2003> -.062 1988< -.035 2009< -.020 2005> -.010 1985< -.010 Higher 1984 .060 1981 .060

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

2003 +3.1 SD

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

07A 1811 to 2010 200 years Series 11

[B] Entire series, effect on correlation ( .551) is:

Lower 1859< -.035 1858< -.024 1821> -.010 1959> -.010 1899> -.009 1969< -.009 Higher 1826 .014 1917 .012

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

1859 -7.2 SD

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

07B 1928 to 2010 83 years Series 12

[B] Entire series, effect on correlation ( .536) is:

Lower 1945< -.034 1962> -.030 1959> -.023 2000< -.017 1982> -.015 1981> -.015 Higher 1948 .030 1950 .017

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

08A 1950 to 2010 61 years Series 13

[B] Entire series, effect on correlation ( .589) is:

Lower 1985< -.033 1963< -.030 1967< -.029 1986< -.013 1960> -.011 1968> -.009 Higher 1981 .030 2006 .027

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

09A 1943 to 2010 68 years Series 14

[B] Entire series, effect on correlation ( .678) is:

Lower 1990< -.021 1972> -.017 1977> -.015 2003> -.014 1947< -.012 1945< -.012 Higher 1948 .042 1962 .027

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09B 1831 to 2010 180 years Series 15

[B] Entire series, effect on correlation ( .577) is:

Lower 1887> -.020 1885> -.012 1938< -.012 1859> -.012 1974< -.008 1901> -.008 Higher 1899 .020 1862 .010

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

1899 -4.8 SD

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

10A 1804 to 2010 207 years Series 16

[\*] Early part of series cannot be checked from 1804 to 1810 -- not matched by another series

[B] Entire series, effect on correlation ( .491) is:

Lower 1981> -.020 1996< -.015 1858> -.011 1852> -.009 1913< -.009 2002> -.008 Higher 1962 .020 1826 .019

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

1901 -1.605 11 2

1902 .098 11 1 >> WARNING: Ring is not usually narrow

1908 -1.860 13 1

1909 -1.042 14 1

1918 -2.043 16 2

1950 -1.597 33 2

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

1981 +3.3 SD; 1996 -5.8 SD

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10B 1968 to 2010 43 years Series 17

[B] Entire series, effect on correlation ( .534) is:

Lower 2001< -.057 2006> -.036 2003> -.024 1995< -.016 2009> -.015 1969> -.014 Higher 1981 .087 2000 .023

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11A 1928 to 2010 83 years Series 18

[B] Entire series, effect on correlation ( .581) is:

Lower 2006> -.037 1995< -.029 1984> -.022 1959> -.017 1974< -.016 2008< -.010 Higher 1962 .055 1950 .021

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11B 1939 to 2010 72 years Series 19

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

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

1961 2010 0 .19 -.15 -.09 -.21 -.15 .04 -.21 .02 .11 -.03 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .308) is:

Lower 1999< -.072 1984> -.039 2006> -.024 1959> -.022 1960> -.017 1997< -.015 Higher 1962 .102 1957 .028

1961 to 2010 segment:

Lower 1999< -.093 1984> -.057 2006> -.039 1997< -.017 2009> -.017 1976< -.016 Higher 1962 .138 2010 .024

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

1960 +3.0 SD; 1984 +3.2 SD

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12A 1939 to 2010 72 years Series 20

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

Lower 1944> -.072 1946< -.032 2008< -.024 1994> -.022 1983< -.014 1972> -.013 Higher 1962 .058 1948 .027

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

1944 +4.8 SD

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12B 1923 to 2010 88 years Series 21

[B] Entire series, effect on correlation ( .476) is:

Lower 1959< -.053 1944> -.040 1962> -.013 1964> -.011 1942> -.010 1994> -.009 Higher 2006 .021 1948 .019

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

1944 +3.3 SD; 2006 -4.8 SD

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13A 1881 to 2010 130 years Series 22

[B] Entire series, effect on correlation ( .563) is:

Lower 1959> -.019 1899> -.016 1904< -.015 1905< -.011 1962> -.010 1914< -.009 Higher 1948 .021 1917 .011

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

1948 -5.9 SD; 2000 -4.6 SD

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13B 1903 to 2010 108 years Series 23

[B] Entire series, effect on correlation ( .472) is:

Lower 1920< -.048 1904< -.029 1984> -.019 1921< -.015 1959> -.012 2010< -.011 Higher 1962 .062 2006 .025

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

1920 -4.5 SD

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

14A 1955 to 2010 56 years Series 24

[B] Entire series, effect on correlation ( .504) is:

Lower 2005< -.112 1973< -.021 1990< -.020 1962> -.015 1982< -.013 1963> -.010 Higher 1957 .023 2006 .020

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14B 1909 to 2010 102 years Series 25

[B] Entire series, effect on correlation ( .460) is:

Lower 1948> -.044 1915< -.018 2009> -.016 1963> -.014 1973< -.012 1989> -.011 Higher 1917 .027 1950 .020

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

1948 +3.1 SD; 2006 -5.4 SD

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15A 1944 to 2010 67 years Series 26

[B] Entire series, effect on correlation ( .392) is:

Lower 1949< -.040 1948> -.040 1944> -.025 1959> -.024 1950> -.014 1945< -.013 Higher 1981 .066 1962 .034

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

15B 1926 to 2010 85 years Series 27

[B] Entire series, effect on correlation ( .539) is:

Lower 1984> -.028 1959> -.022 1930> -.015 1957< -.013 1927< -.013 1956> -.011 Higher 1981 .029 2006 .018

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

1950 -1.597 33 2

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16A 1947 to 2010 64 years Series 28

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

Lower 2010< -.023 1959> -.020 1989> -.014 1984> -.013 1961< -.012 1975> -.010 Higher 1962 .033 1950 .023

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

16B 1899 to 2010 112 years Series 29

[B] Entire series, effect on correlation ( .560) is:

Lower 1925< -.040 1963< -.013 1926> -.012 1975> -.012 1997< -.010 1913< -.009 Higher 1948 .036 2006 .016

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

17A 1930 to 2010 81 years Series 30

[B] Entire series, effect on correlation ( .441) is:

Lower 1984> -.035 2006> -.021 1950> -.020 1930> -.016 1978< -.016 1973< -.015 Higher 1948 .083 1999 .015

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

1984 +3.1 SD

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

17B 1932 to 2010 79 years Series 31

[B] Entire series, effect on correlation ( .550) is:

Lower 2003> -.026 1948> -.022 1946< -.020 1975> -.019 1970< -.018 1984> -.013 Higher 1962 .039 1989 .015

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

1949 +3.1 SD

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

18A 1914 to 2010 97 years Series 32

[B] Entire series, effect on correlation ( .663) is:

Lower 1972< -.042 1960> -.028 1980< -.015 1937> -.015 1982> -.012 2006> -.011 Higher 1981 .018 1962 .014

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18B 1942 to 2010 69 years Series 33

[B] Entire series, effect on correlation ( .631) is:

Lower 1977< -.050 1960> -.022 2001< -.016 1996> -.015 2004< -.012 1975> -.011 Higher 1962 .056 1957 .013

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19A 1882 to 2010 129 years Series 34

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

Lower 1883> -.014 1990< -.013 1926< -.012 1965< -.009 1908> -.009 1995< -.008 Higher 1962 .025 1948 .013

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

1901 -1.605 11 2

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19B 1917 to 2010 94 years Series 35

[B] Entire series, effect on correlation ( .532) is:

Lower 1917> -.064 1959> -.024 2009< -.014 1969> -.013 1928< -.012 1926> -.012 Higher 1962 .037 1981 .033

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

1917 +3.4 SD

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20A 1859 to 2010 152 years Series 36

[B] Entire series, effect on correlation ( .656) is:

Lower 1948> -.014 1859> -.013 2006> -.013 1865< -.012 1876> -.009 1877> -.007 Higher 1917 .013 1899 .012

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

1962 -4.7 SD

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20B 1879 to 2010 132 years Series 37

[B] Entire series, effect on correlation ( .661) is:

Lower 1948> -.039 1930< -.022 1942< -.009 2000> -.006 1963> -.005 2002> -.005 Higher 1962 .022 1981 .014

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

1948 +3.1 SD

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21A 1943 to 2010 68 years Series 38

[B] Entire series, effect on correlation ( .601) is:

Lower 1962> -.058 1971< -.038 1995< -.010 1950> -.009 2000> -.009 1966< -.008 Higher 1981 .031 2010 .011

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

2006 -1.877 38 1

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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 01A 1872 2010 139 6 0 .581 1.02 3.46 .664 .823 .318 2.80 .377 .019 1

2 01B 1862 2010 149 6 0 .541 1.11 3.54 .781 .872 .357 2.58 .398 .009 1

3 02A 1859 2010 152 6 1 .537 .94 2.17 .452 .844 .238 2.85 .477 -.023 1

4 02B 1906 2010 105 4 0 .504 .76 1.70 .347 .800 .277 2.62 .535 -.077 1

5 03A 1925 2010 86 3 0 .536 2.06 4.50 .785 .736 .214 2.56 .412 -.018 2

6 03B 1947 2010 64 3 0 .583 2.28 5.31 .950 .828 .211 2.52 .462 -.103 1

7 05A 1943 2010 68 3 0 .651 2.34 5.31 1.018 .689 .266 2.62 .545 -.012 2

8 05C 1966 2010 45 1 0 .406 2.62 4.06 .581 .047 .221 2.50 .496 .180 1

9 06A 1952 2010 59 2 0 .587 3.43 6.07 1.001 .627 .188 2.72 .514 -.044 1

10 06B 1977 2010 34 1 0 .380 4.09 5.79 .911 .723 .131 2.55 .609 .009 1

11 07A 1811 2010 200 8 0 .551 1.41 4.27 .911 .813 .329 2.64 .418 .011 2

12 07B 1928 2010 83 3 0 .536 2.86 5.92 1.327 .763 .239 2.65 .440 -.042 1

13 08A 1950 2010 61 2 0 .589 2.18 5.17 .918 .597 .250 2.81 .582 .059 1

14 09A 1943 2010 68 3 0 .678 3.10 5.27 1.034 .634 .229 2.63 .511 .023 3

15 09B 1831 2010 180 7 0 .577 1.33 7.79 1.257 .808 .352 2.77 .391 .005 2

16 10A 1804 2010 207 8 0 .491 .81 5.28 .908 .740 .507 2.75 .464 .001 4

17 10B 1968 2010 43 1 0 .534 4.02 7.46 1.781 .866 .179 2.75 .608 .064 2

18 11A 1928 2010 83 3 0 .581 2.34 6.07 1.245 .916 .179 2.88 .578 -.114 1

19 11B 1939 2010 72 3 1 .308 2.35 4.45 1.005 .874 .179 2.84 .571 -.047 2

20 12A 1939 2010 72 3 0 .603 2.03 4.99 1.165 .870 .235 2.86 .586 -.004 1

21 12B 1923 2010 88 4 0 .476 1.89 5.09 1.394 .905 .277 2.41 .320 .073 4

22 13A 1881 2010 130 5 0 .563 1.25 2.50 .571 .840 .238 2.44 .324 -.034 3

23 13B 1903 2010 108 4 0 .472 1.63 3.19 .704 .873 .200 2.57 .474 -.053 1

24 14A 1955 2010 56 2 0 .504 2.07 4.16 1.191 .937 .179 2.51 .472 .025 1

25 14B 1909 2010 102 4 0 .460 1.21 4.48 1.083 .954 .235 2.75 .360 -.015 1

26 15A 1944 2010 67 3 0 .392 2.05 4.56 1.262 .878 .334 2.57 .400 -.012 1

27 15B 1926 2010 85 3 0 .539 1.67 3.82 1.081 .850 .343 2.53 .388 -.059 1

28 16A 1947 2010 64 3 0 .593 3.25 6.33 1.510 .895 .219 2.41 .401 -.064 1

29 16B 1899 2010 112 5 0 .560 1.34 3.51 .830 .827 .295 2.63 .502 -.072 1

30 17A 1930 2010 81 3 0 .441 1.93 3.70 .714 .698 .233 2.53 .415 -.076 1

31 17B 1932 2010 79 3 0 .550 1.68 3.43 .668 .729 .251 2.92 .590 .045 1

32 18A 1914 2010 97 4 0 .663 2.47 6.81 1.532 .814 .342 2.50 .427 -.032 2

33 18B 1942 2010 69 3 0 .631 2.70 6.62 1.637 .789 .400 2.72 .571 .012 1

34 19A 1882 2010 129 5 0 .606 1.72 5.17 1.410 .939 .349 2.81 .561 -.043 2

35 19B 1917 2010 94 4 0 .532 2.23 5.53 1.376 .890 .261 2.86 .521 -.034 1

36 20A 1859 2010 152 6 0 .656 1.72 4.94 1.151 .927 .230 2.41 .317 -.007 1

37 20B 1879 2010 132 5 0 .661 1.25 3.36 .775 .874 .258 2.82 .490 -.025 1

38 21A 1943 2010 68 3 0 .601 .67 1.47 .259 .666 .289 2.51 .416 -.005 2

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Total or mean: 3683 145 2 .550 1.74 7.79 .975 .813 .283 2.92 .456 -.015

- = [ COFECHA TSCA COF ] = -