[] Dendrochronology Program Library Run SWL Program COF 17:28 Fri 07 Jul 2017 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30140

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: swl.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 1758 to 2016 259 years

Continuous time span is 1758 to 2016 259 years

Portion with two or more series is 1781 to 2016 236 years

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

\*C\* Number of dated series 16 \*C\*

\*O\* Master series 1758 2016 259 yrs \*O\*

\*F\* Total rings in all series 2086 \*F\*

\*E\* Total dated rings checked 2063 \*E\*

\*C\* Series intercorrelation .563 \*C\*

\*H\* Average mean sensitivity .291 \*H\*

\*A\* Segments, possible problems 5 \*A\*

\*\*\* Mean length of series 130.4 \*\*\*

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

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

No ring measurements of zero value

PART 2: TIME PLOT OF TREE-RING SERIES: 17:28 Fri 07 Jul 2017 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

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

. . . . . . . . . . . . . . . . <==================> . SWL01A 1 1827 2016 190

. . . . . . . . . . . . . . . . <===============> . SWL01B 2 1854 2016 163

. . . . . . . . . . . . . . . . .<==============> . SWL02A 3 1869 2016 148

. . . . . . . . . . . . . . . . . <==========> . SWL02B 4 1904 2016 113

. . . . . . . . . . . . . . <=========================> . SWL03A 5 1758 2016 259

. . . . . . . . . . . . . . . <======================> . SWL03B 6 1781 2016 236

. . . . . . . . . . . . . . . . . . <======> . SWL04A 7 1940 2016 77

. . . . . . . . . . . . . . . . . . <======> . SWL04B 8 1946 2016 71

. . . . . . . . . . . . . . . . . <==========> . SWL05B 9 1908 2016 109

. . . . . . . . . . . . . . . . . . <========> . SWL07A 10 1928 2016 89

. . . . . . . . . . . . . . . . . .<=========> . SWL07B 11 1911 2016 106

. . . . . . . . . . . . . . . . . . <========> . SWL08B 12 1929 2016 88

. . . . . . . . . . . . . . . . . <==========> . SWL09A 13 1903 2016 114

. . . . . . . . . . . . . . . . . <==========> . SWL09B 14 1904 2016 113

. . . . . . . . . . . . . . . . . .<=========> . SWL10A 15 1915 2016 102

. . . . . . . . . . . . . . . . . <==========> . SWL10B 16 1909 2016 108

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

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: 17:28 Fri 07 Jul 2017 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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1800 -.750 2 1850 -1.061 3 1900 .382 5 1950 -.247 16 2000 1.332 16

1801 .753 2 1851 -.343 3 1901 -.259 5 1951 .322 16 2001 .038 16

1802 1.016 2 1852 -.088 3 1902 -.742 5 1952 -.015 16 2002 .123 16

1803 1.920 2 1853 .784 3 1903 -.214 6 1953 -.507 16 2003 -.316 16

1804 .843 2 1854 1.778 4 1904 .977 8 1954 -2.715 16 2004 1.164 16

1805 1.317 2 1855 1.348 4 1905 .211 8 1955 -.073 16 2005 -.290 16

1806 .125 2 1856 1.050 4 1906 -.350 8 1956 .286 16 2006 -.821 16

1807 .731 2 1857 .000 4 1907 .040 8 1957 -1.626 16 2007 -.968 16

1758 1.752 1 1808 1.658 2 1858 -.257 4 1908 -1.936 9 1958 .521 16 2008 -.363 16

1759 -1.362 1 1809 -1.880 2 1859 -.363 4 1909 .758 10 1959 .423 16 2009 .430 16

1760 -1.863 1 1810 .377 2 1860 -1.585 4 1910 .984 10 1960 .270 16 2010 1.131 16

1761 .028 1 1811 -2.629 2 1861 -1.553 4 1911 -.638 11 1961 -1.150 16 2011 .839 16

1762 .096 1 1812 -.635 2 1862 -.889 4 1912 1.369 11 1962 .238 16 2012 -1.057 16

1763 1.752 1 1813 .132 2 1863 -1.104 4 1913 -.058 11 1963 -.384 16 2013 -1.531 16

1764 1.207 1 1814 1.616 2 1864 -.273 4 1914 -.564 11 1964 .381 16 2014 .342 16

1765 -.862 1 1815 1.687 2 1865 -.170 4 1915 1.261 12 1965 .906 16 2015 -.006 16

1766 -.138 1 1816 1.730 2 1866 -.070 4 1916 .911 12 1966 .839 16 2016 .992 16

1767 -2.241 1 1817 .596 2 1867 .111 4 1917 .412 12 1967 -.066 16

1768 -.116 1 1818 -.450 2 1868 1.480 4 1918 -.048 12 1968 .699 16

1769 .680 1 1819 .943 2 1869 1.344 5 1919 -.543 12 1969 -.091 16

1770 .274 1 1820 -.557 2 1870 1.434 5 1920 -.134 12 1970 .763 16

1771 1.990 1 1821 -1.155 2 1871 .644 5 1921 -.747 12 1971 .813 16

1772 .071 1 1822 -.010 2 1872 .343 5 1922 -.010 12 1972 -.172 16

1773 1.273 1 1823 -.842 2 1873 -.194 5 1923 -.153 12 1973 1.459 16

1774 -2.475 1 1824 -1.504 2 1874 -.773 5 1924 -.308 12 1974 1.106 16

1775 -.024 1 1825 -.512 2 1875 -.022 5 1925 -1.142 12 1975 .117 16

1776 -.937 1 1826 -.151 2 1876 .553 5 1926 .132 12 1976 .744 16

1777 -.993 1 1827 -1.308 3 1877 -.829 5 1927 .572 12 1977 -.146 16

1778 -.145 1 1828 -1.170 3 1878 -.377 5 1928 .785 13 1978 -.633 16

1779 1.678 1 1829 -.778 3 1879 -1.089 5 1929 .151 14 1979 -.004 16

1780 1.728 1 1830 .289 3 1880 -.500 5 1930 -.269 14 1980 -.016 16

1781 -.159 2 1831 .903 3 1881 .348 5 1931 -.543 14 1981 -3.926 16

1782 -.404 2 1832 -.500 3 1882 .672 5 1932 -.300 14 1982 -.030 16

1783 1.004 2 1833 1.132 3 1883 2.159 5 1933 -1.612 14 1983 -.460 16

1784 1.574 2 1834 1.631 3 1884 .627 5 1934 -.142 14 1984 -2.201 16

1785 1.528 2 1835 2.133 3 1885 1.053 5 1935 .598 14 1985 -.097 16

1786 .595 2 1836 .041 3 1886 -.400 5 1936 -.014 14 1986 -.246 16

1787 1.263 2 1837 .108 3 1887 -1.453 5 1937 .192 14 1987 .017 16

1788 -1.726 2 1838 -.225 3 1888 -2.607 5 1938 2.080 14 1988 -.557 16

1789 -1.985 2 1839 -.733 3 1889 1.345 5 1939 .221 14 1989 .738 16

1790 -2.251 2 1840 -.563 3 1890 .320 5 1940 .530 15 1990 -.180 16

1791 -2.559 2 1841 -.762 3 1891 -.154 5 1941 .283 15 1991 -.347 16

1792 -.210 2 1842 -1.196 3 1892 -.488 5 1942 1.074 15 1992 .854 16

1793 -1.145 2 1843 .234 3 1893 -.035 5 1943 -.658 15 1993 .836 16

1794 -.117 2 1844 1.328 3 1894 -.130 5 1944 -.875 15 1994 -.039 16

1795 .050 2 1845 .067 3 1895 -1.980 5 1945 .203 15 1995 .828 16

1796 1.488 2 1846 .242 3 1896 .288 5 1946 -.289 16 1996 -.919 16

1797 -1.075 2 1847 -.278 3 1897 -.406 5 1947 .402 16 1997 .019 16

1798 -.477 2 1848 -.071 3 1898 -.719 5 1948 .315 16 1998 .274 16

1799 .628 2 1849 -.157 3 1899 -.824 5 1949 -.052 16 1999 1.044 16

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PART 4: Master Bar Plot: 17:28 Fri 07 Jul 2017 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

1800--c 1850-d 1900-------B 1950---a 2000---------E

1801--------C 1851---a 1901---a 1951-------A 2001-----@

1802---------D 1852----@ 1902--c 1952-----@ 2002------@

1803----------H 1853--------C 1903----a 1953--b 2003---a

1804--------C 1854----------G 1904---------D 1954k 2004---------E

1805---------E 1855---------E 1905------A 1955-----@ 2005---a

1806------A 1856---------D 1906---a 1956-------A 2006-c

1807--------C 1857-----@ 1907-----@ 1957g 2007-d

1758----------G 1808----------G 1858---a 1908h 1958-------B 2008---a

1759-e 1809h 1859---a 1909--------C 1959-------B 2009-------B

1760g 1810-------B 1860f 1910---------D 1960-------A 2010---------E

1761-----@ 1811k 1861f 1911--c 1961-e 2011--------C

1762------@ 1812--c 1862-d 1912---------E 1962------A 2012-d

1763----------G 1813------A 1863-d 1913-----@ 1963---b 2013f

1764---------E 1814----------F 1864---a 1914--b 1964-------B 2014-------A

1765-c 1815----------G 1865----a 1915---------E 1965--------D 2015-----@

1766----a 1816----------G 1866-----@ 1916--------D 1966--------C 2016---------D

1767i 1817--------B 1867------@ 1917-------B 1967-----@

1768----@ 1818--b 1868----------F 1918-----@ 1968--------C

1769--------C 1819--------D 1869---------E 1919--b 1969----@

1770-------A 1820--b 1870----------F 1920----a 1970--------C

1771----------H 1821-e 1871--------C 1921--c 1971--------C

1772------@ 1822-----@ 1872-------A 1922-----@ 1972----a

1773---------E 1823-c 1873----a 1923----a 1973----------F

1774j 1824f 1874--c 1924---a 1974---------D

1775-----@ 1825--b 1875-----@ 1925-e 1975------@

1776-d 1826----a 1876-------B 1926------A 1976--------C

1777-d 1827-e 1877-c 1927-------B 1977----a

1778----a 1828-e 1878---b 1928--------C 1978--c

1779----------G 1829--c 1879-d 1929------A 1979-----@

1780----------G 1830-------A 1880--b 1930---a 1980-----@

1781----a 1831--------D 1881-------A 1931--b 1981p

1782---b 1832--b 1882--------C 1932---a 1982-----@

1783---------D 1833---------E 1883----------I 1933f 1983--b

1784----------F 1834----------G 1884--------C 1934----a 1984i

1785----------F 1835----------I 1885---------D 1935--------B 1985----@

1786--------B 1836-----@ 1886---b 1936-----@ 1986---a

1787---------E 1837------@ 1887f 1937------A 1987-----@

1788g 1838----a 1888j 1938----------H 1988--b

1789h 1839--c 1889---------E 1939------A 1989--------C

1790i 1840--b 1890-------A 1940-------B 1990----a

1791j 1841--c 1891----a 1941-------A 1991---a

1792----a 1842-e 1892--b 1942---------D 1992--------C

1793-e 1843------A 1893-----@ 1943--c 1993--------C

1794----@ 1844---------E 1894----a 1944-d 1994-----@

1795-----@ 1845------@ 1895h 1945------A 1995--------C

1796----------F 1846------A 1896-------A 1946---a 1996-d

1797-d 1847---a 1897---b 1947-------B 1997-----@

1798--b 1848-----@ 1898--c 1948-------A 1998-------A

1799--------C 1849----a 1899-c 1949-----@ 1999---------D

PART 5: CORRELATION OF SERIES BY SEGMENTS: 17:28 Fri 07 Jul 2017 Page 5

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Correlations of 50-year dated segments, lagged 25 years

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

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

1824 1849 1874 1899 1924 1949 1974 1999 2024

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

1 SWL01A 1827 2016 .36 .69 .73 .72 .71 .42 .38

2 SWL01B 1854 2016 .50 .63 .59 .60 .49 .49

3 SWL02A 1869 2016 .39 .34 .35 .73 .62 .56

4 SWL02B 1904 2016 .53 .43 .52 .50

5 SWL03A 1758 2016 .70 .61 .51B .59 .38 .27B .50 .69 .73

6 SWL03B 1781 2016 .71 .59 .35B .49 .43 .39 .55 .75 .79

7 SWL04A 1940 2016 .43 .48 .60

8 SWL04B 1946 2016 .45 .45 .48

9 SWL05B 1908 2016 .42 .35 .60 .52

10 SWL07A 1928 2016 .47 .66 .68

11 SWL07B 1911 2016 .19A .26A .50 .64

12 SWL08B 1929 2016 .42 .63 .65

13 SWL09A 1903 2016 .64 .54 .71 .77

14 SWL09B 1904 2016 .50 .52 .74 .82

15 SWL10A 1915 2016 .73 .75 .73 .70

16 SWL10B 1909 2016 .69 .71 .54 .43

Av segment correlation .71 .60 .41 .53 .50 .50 .53 .60 .61

PART 6: POTENTIAL PROBLEMS: 17:28 Fri 07 Jul 2017 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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SWL01A 1827 to 2016 190 years Series 1

[B] Entire series, effect on correlation ( .535) is:

Lower 1981> -.028 1834< -.016 1984> -.016 1995< -.010 1833< -.009 1829> -.008 Higher 1954 .017 1908 .015

[E] Outliers 7 3.0 SD above or -4.5 SD below mean for year

1829 +3.2 SD; 1843 +3.3 SD; 1865 +3.1 SD; 1900 +3.3 SD; 1954 -6.9 SD; 1981 +4.1 SD; 1984 +3.3 SD

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

SWL01B 1854 to 2016 163 years Series 2

[B] Entire series, effect on correlation ( .543) is:

Lower 1981> -.033 1855< -.016 1887> -.011 1858> -.011 1998< -.010 1918> -.008 Higher 1954 .022 1908 .015

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

1858 +3.2 SD; 1918 +3.2 SD; 1933 -5.0 SD; 1981 +4.0 SD

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

SWL02A 1869 to 2016 148 years Series 3

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

Lower 1908> -.026 1907< -.017 1901> -.015 1970< -.011 1916< -.008 2006< -.008 Higher 1954 .026 1984 .019

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

1901 +4.2 SD; 1954 -6.1 SD; 1981 +3.0 SD; 2006 -5.3 SD

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

SWL02B 1904 to 2016 113 years Series 4

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

Lower 1967< -.103 1996> -.008 1915< -.007 1948< -.007 1972> -.006 1943> -.005 Higher 1984 .031 1954 .019

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

1967 -7.5 SD; 1984 -4.8 SD

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

SWL03A 1758 to 2016 259 years Series 5

[\*] Early part of series cannot be checked from 1758 to 1780 -- 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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1825 1874 -1 -.15 -.12 -.17 -.24 -.27 .00 .15 .22 .28 .51\* .51| .24 .03 -.13 -.20 -.26 -.41 -.46 -.28 .00 .01

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

1900 1949 2 .14 -.01 .05 -.16 .17 -.08 .04 .15 -.27 -.15 .27|-.11 .36\* .01 -.11 .13 -.04 .11 -.05 -.29 -.09

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

Lower 1908> -.012 1900< -.010 1913> -.008 1884< -.007 1806> -.007 1921> -.006 Higher 1981 .043 1984 .011

1825 to 1874 segment:

Lower 1847> -.037 1846< -.028 1840> -.025 1838> -.023 1857> -.022 1868< -.019 Higher 1854 .034 1835 .033

1900 to 1949 segment:

Lower 1908> -.066 1900< -.050 1913> -.044 1921> -.036 1925> -.031 1928< -.021 Higher 1938 .133 1904 .024

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

1875 +3.3 SD; 1908 +3.5 SD; 1955 +3.1 SD

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

SWL03B 1781 to 2016 236 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

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

1825 1874 1 -.19 .07 -.09 -.25 -.25 -.26 -.15 .00 .12 .20 .35| .41\* .31 .25 .04 -.13 -.39 -.43 -.22 -.16 .13

[B] Entire series, effect on correlation ( .596) is:

Lower 1869< -.020 1900< -.015 1847< -.009 1917< -.008 1806< -.007 1819< -.005 Higher 1981 .044 1938 .009

1825 to 1874 segment:

Lower 1869< -.115 1847< -.049 1846> -.018 1866> -.017 1857< -.014 1830< -.012 Higher 1854 .041 1834 .030

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

1833 +3.2 SD

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

SWL04A 1940 to 2016 77 years Series 7

[B] Entire series, effect on correlation ( .480) is:

Lower 1957> -.035 1982< -.033 2006> -.021 1965< -.020 1967> -.015 1968< -.015 Higher 1981 .105 1996 .018

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

1957 +3.4 SD; 2006 +3.5 SD

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

SWL04B 1946 to 2016 71 years Series 8

[B] Entire series, effect on correlation ( .389) is:

Lower 1960< -.047 1991> -.027 1954> -.026 2003> -.019 1995< -.017 2005> -.016 Higher 1981 .198 1984 .021

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

1954 +3.6 SD; 1960 -4.6 SD; 1991 +4.4 SD; 2003 +3.7 SD

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SWL05B 1908 to 2016 109 years Series 9

[B] Entire series, effect on correlation ( .483) is:

Lower 2004< -.019 1967> -.016 1982< -.014 2002< -.012 1918> -.012 1954> -.011 Higher 1981 .150 1961 .011

[E] Outliers 5 3.0 SD above or -4.5 SD below mean for year

1920 +3.0 SD; 1942 +3.1 SD; 1967 +3.2 SD; 1982 -5.1 SD; 2002 -4.8 SD

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

SWL07A 1928 to 2016 89 years Series 10

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

Lower 2006> -.028 1955< -.022 1951< -.021 1984> -.019 1930> -.012 1943> -.011 Higher 1981 .130 1954 .018

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

2006 +3.7 SD

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SWL07B 1911 to 2016 106 years Series 11

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

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

1911 1960 0 -.16 -.01 .12 -.15 .15 -.04 -.08 .12 -.08 -.28 .19\* .04 .11 .01 .15 .14 -.19 -.06 -.12 .12 .16

1925 1974 0 -.12 .07 .09 .20 .19 -.05 .13 .00 -.04 -.24 .26\* .08 .09 .07 .18 .15 -.12 -.13 -.15 .08 -.08

[B] Entire series, effect on correlation ( .457) is:

Lower 1954> -.044 1940< -.027 1952< -.023 1979< -.013 2013> -.012 2015< -.011 Higher 1981 .102 1938 .014

1911 to 1960 segment:

Lower 1954> -.081 1940< -.051 1952< -.030 1959< -.019 1956< -.016 1946> -.012 Higher 1938 .058 1915 .045

1925 to 1974 segment:

Lower 1954> -.080 1940< -.060 1952< -.040 1959< -.023 1956< -.019 1946> -.012 Higher 1938 .043 1961 .036

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

1954 +4.3 SD; 1955 +4.5 SD

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SWL08B 1929 to 2016 88 years Series 12

[B] Entire series, effect on correlation ( .562) is:

Lower 1933> -.034 2009< -.017 1962< -.017 1932> -.011 1958< -.011 1963< -.009 Higher 1984 .037 1954 .033

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

1933 +4.0 SD

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SWL09A 1903 to 2016 114 years Series 13

[B] Entire series, effect on correlation ( .683) is:

Lower 1957> -.018 1965< -.010 2006< -.009 1913> -.008 1954> -.007 1945< -.006 Higher 1981 .066 1908 .016

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SWL09B 1904 to 2016 113 years Series 14

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

Lower 1905< -.031 1957> -.019 1945< -.011 1984> -.011 1918< -.010 1959< -.010 Higher 1981 .102 1908 .017

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

1905 -4.5 SD; 1981 -5.6 SD

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SWL10A 1915 to 2016 102 years Series 15

[B] Entire series, effect on correlation ( .710) is:

Lower 1993< -.031 1996> -.015 1943> -.006 1926< -.006 1964< -.005 1929> -.005 Higher 1954 .024 1984 .018

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SWL10B 1909 to 2016 108 years Series 16

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

Lower 1996> -.034 1981> -.034 1999< -.022 1946< -.018 2000< -.017 1943> -.010 Higher 1954 .033 1938 .020

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

1946 -4.6 SD; 1957 -6.1 SD; 1981 +3.1 SD; 1996 +3.5 SD

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

PART 7: DESCRIPTIVE STATISTICS: 17:28 Fri 07 Jul 2017 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 ()

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

1 SWL01A 1827 2016 190 7 0 .535 1.22 4.06 .763 .795 .275 2.55 .308 .005 1

2 SWL01B 1854 2016 163 6 0 .543 1.74 5.45 1.074 .784 .277 2.54 .446 -.006 1

3 SWL02A 1869 2016 148 6 0 .544 1.68 4.67 .831 .662 .258 2.65 .339 -.025 2

4 SWL02B 1904 2016 113 4 0 .544 1.73 6.26 .915 .731 .217 2.57 .349 .009 1

5 SWL03A 1758 2016 259 9 2 .577 .97 8.74 .834 .622 .312 3.00 .354 -.010 1

6 SWL03B 1781 2016 236 9 1 .596 1.00 5.18 .842 .668 .339 2.97 .333 -.051 1

7 SWL04A 1940 2016 77 3 0 .480 1.34 4.86 .718 .443 .344 2.86 .604 .037 1

8 SWL04B 1946 2016 71 3 0 .389 1.59 4.92 .759 .169 .390 2.84 .480 .053 2

9 SWL05B 1908 2016 109 4 0 .483 1.67 9.37 1.630 .760 .269 2.77 .351 .003 1

10 SWL07A 1928 2016 89 3 0 .589 1.95 5.46 1.030 .506 .289 2.61 .410 -.041 1

11 SWL07B 1911 2016 106 4 2 .457 1.93 4.38 .856 .514 .312 3.04 .517 -.002 1

12 SWL08B 1929 2016 88 3 0 .562 2.26 4.28 .810 .652 .249 2.74 .489 .035 1

13 SWL09A 1903 2016 114 4 0 .683 1.93 4.68 .837 .648 .278 2.63 .455 -.086 1

14 SWL09B 1904 2016 113 4 0 .661 2.19 4.68 .911 .695 .263 2.39 .323 -.047 1

15 SWL10A 1915 2016 102 4 0 .710 1.68 5.11 1.028 .777 .283 2.67 .471 .001 1

16 SWL10B 1909 2016 108 4 0 .551 1.84 6.49 1.058 .594 .292 2.68 .400 -.003 1

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Total or mean: 2086 77 5 .563 1.56 9.37 .920 .652 .291 3.04 .395 -.013

- = [ COFECHA SWL COF ] = -