[] Dendrochronology Program Library Run RNT Program COF 16:57 Fri 12 Jan 2018 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30329

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: rnt.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 894 to 2016 1123 years

Continuous time span is 1773 to 2016 244 years

Portion with two or more series is 1779 to 2016 238 years

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

\*C\* Number of dated series 19 \*C\*

\*O\* Master series 894 2016 1123 yrs \*O\*

\*F\* Total rings in all series 2577 \*F\*

\*E\* Total dated rings checked 2571 \*E\*

\*C\* Series intercorrelation .633 \*C\*

\*H\* Average mean sensitivity .334 \*H\*

\*A\* Segments, possible problems 4 \*A\*

\*\*\* Mean length of series 135.6 \*\*\*

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

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: 16:57 Fri 12 Jan 2018 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

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

. . . . . . . . . . . . . . . . . <===========> . RNT01A 1 1890 2016 127

. . . . . . . . . . . . . . . . . <=============> . RNT02A 2 1873 2016 144

. . . . . . . . . . . . . . . . . <===========> . RNT02B 3 1893 2016 124

> . . . . . . . . . . . . . . . . . . . . . RNT03A 1 4 894 1016 123

. . . . . . . . . . . . . . . . . <=============> . RNT03B 5 1879 2016 138

. . . . . . . . . . . . . . . . . <============> . RNT04A 6 1884 2016 133

. . . . . . . . . . . . . . . . . <===========> . RNT04B 7 1890 2016 127

. . . . . . . . . . . . . . . . . .<=========> . RNT05A 8 1914 2016 103

. . . . . . . . . . . . . . . . . . <========> . RNT05B 9 1926 2016 91

. . . . . . . . . . . . . . . . . <===========> . RNT06A 10 1893 2016 124

. . . . . . . . . . . . . . . . . <============> . RNT06B 11 1888 2016 129

. . . . . . . . . . . . . . . . . <============> . RNT07A 12 1885 2016 132

. . . . . . . . . . . . . . . . . <==========> . RNT07B 13 1901 2016 116

. . . . . . . . . . . . . . . . . <==========> . RNT08A 14 1903 2016 114

. . . . . . . . . . . . . . . . . <==========> . RNT08B 15 1905 2016 112

. . . . . . . . . . . . . . . <=======================> . RNT09A 16 1773 2016 244

. . . . . . . . . . . . . . . <=======================> . RNT09B 17 1779 2016 238

. . . . . . . . . . . . . . . . . <============> . RNT10A 18 1884 2016 133

. . . . . . . . . . . . . . . . . <===========> . RNT10B 19 1892 2016 125

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

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: 16:57 Fri 12 Jan 2018 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 .998 2 1850 1.636 2 1900 -1.212 13 1950 .771 18 2000 .883 18

1801 .842 2 1851 1.159 2 1901 .718 14 1951 .767 18 2001 1.033 18

1802 .785 2 1852 1.766 2 1902 .585 14 1952 -.029 18 2002 1.086 18

1803 -.131 2 1853 1.174 2 1903 .507 15 1953 .189 18 2003 .563 18

1804 .872 2 1854 -.475 2 1904 -.680 15 1954 .097 18 2004 .819 18

1805 -.965 2 1855 -.159 2 1905 -.379 16 1955 .885 18 2005 -.462 18

1806 -2.384 2 1856 .256 2 1906 .773 16 1956 .290 18 2006 -.056 18

1807 -3.509 2 1857 -.942 2 1907 .449 16 1957 .188 18 2007 -.566 18

1808 -2.263 2 1858 -.170 2 1908 -.539 16 1958 .466 18 2008 .690 18

1809 -.437 2 1859 .300 2 1909 .129 16 1959 -.739 18 2009 -.662 18

1810 -.117 2 1860 .531 2 1910 -.144 16 1960 .150 18 2010 -.711 18

1811 .802 2 1861 .213 2 1911 -.569 16 1961 1.020 18 2011 .599 18

1812 -.447 2 1862 1.393 2 1912 .635 16 1962 -.334 18 2012 -.892 18

1813 .186 2 1863 -.737 2 1913 .996 16 1963 .462 18 2013 .422 18

1814 .817 2 1864 -1.188 2 1914 -.550 17 1964 -.171 18 2014 -.051 18

1815 .720 2 1865 .504 2 1915 1.206 17 1965 -1.975 18 2015 -2.047 18

1816 .773 2 1866 .713 2 1916 .731 17 1966 -3.715 18 2016 .303 18

1817 1.105 2 1867 .707 2 1917 .220 17 1967 -.527 18

1818 1.998 2 1868 1.797 2 1918 -1.244 17 1968 -.240 18

1819 .273 2 1869 1.350 2 1919 -1.244 17 1969 .525 18

1820 .419 2 1870 .131 2 1920 -.272 17 1970 -.360 18

1821 .153 2 1871 -1.034 2 1921 -.066 17 1971 -.307 18

1822 -.589 2 1872 -1.906 2 1922 .470 17 1972 -1.167 18

1773 1.895 1 1823 .023 2 1873 -2.581 3 1923 1.284 17 1973 1.004 18

1774 -.769 1 1824 .460 2 1874 -.916 3 1924 .837 17 1974 .992 18

1775 -.325 1 1825 1.400 2 1875 -.489 3 1925 -.135 17 1975 .823 18

1776 1.234 1 1826 1.101 2 1876 .364 3 1926 -.086 18 1976 .366 18

1777 -.606 1 1827 -.416 2 1877 1.287 3 1927 1.067 18 1977 -.493 18

1778 .080 1 1828 1.228 2 1878 .758 3 1928 .819 18 1978 .189 18

1779 1.049 2 1829 -.345 2 1879 .628 4 1929 .005 18 1979 -.541 18

1780 .406 2 1830 1.169 2 1880 .505 4 1930 -1.722 18 1980 1.573 18

1781 .880 2 1831 -.583 2 1881 -.560 4 1931 -1.191 18 1981 .901 18

1782 .046 2 1832 .518 2 1882 1.399 4 1932 .473 18 1982 .598 18

1783 .362 2 1833 -.472 2 1883 .692 4 1933 -.431 18 1983 1.214 18

1784 -.396 2 1834 -4.357 2 1884 -.441 6 1934 -1.042 18 1984 -.231 18

1785 -.926 2 1835 -1.636 2 1885 .498 7 1935 .370 18 1985 .390 18

1786 -1.313 2 1836 -.273 2 1886 .393 7 1936 -2.155 18 1986 -.399 18

1787 -1.892 2 1837 -.592 2 1887 .005 7 1937 -.806 18 1987 -1.243 18

1788 -.469 2 1838 .296 2 1888 .054 8 1938 .799 18 1988 -2.268 18

1789 -.831 2 1839 -.826 2 1889 .748 8 1939 .001 18 1989 -1.950 18

1790 -1.502 2 1840 -.338 2 1890 .300 10 1940 .271 18 1990 -.916 18

1791 -.689 2 1841 -.360 2 1891 .941 10 1941 .654 18 1991 -.044 18

1792 .814 2 1842 -.541 2 1892 .977 11 1942 .901 18 1992 -.003 18

1793 1.788 2 1843 -1.173 2 1893 .070 13 1943 .831 18 1993 -.575 18

1794 1.756 2 1844 -2.065 2 1894 -.764 13 1944 -.742 18 1994 -.015 18

1795 1.370 2 1845 -1.736 2 1895 -1.202 13 1945 -1.138 18 1995 .800 18

1796 .210 2 1846 -1.519 2 1896 -.688 13 1946 .217 18 1996 -.008 18

1797 .111 2 1847 -.277 2 1897 -.435 13 1947 .088 18 1997 -.145 18

1798 .780 2 1848 .667 2 1898 -.666 13 1948 -.550 18 1998 1.398 18

1799 .256 2 1849 .775 2 1899 -.123 13 1949 1.240 18 1999 -.112 18

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PART 4: Master Bar Plot: 16:57 Fri 12 Jan 2018 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---------D 1850----------G 1900-e 1950--------C 2000--------D

1801--------C 1851---------E 1901--------C 1951--------C 2001---------D

1802--------C 1852----------G 1902-------B 1952----@ 2002---------D

1803----a 1853---------E 1903-------B 1953-----A 2003-------B

1804--------C 1854---b 1904--c 1954-----@ 2004--------C

1805-d 1855----a 1905---b 1955--------D 2005---b

1806j 1856------A 1906--------C 1956------A 2006----@

1807n 1857-d 1907------B 1957-----A 2007--b

1808i 1858----a 1908--b 1958-------B 2008--------C

1809---b 1859------A 1909-----A 1959--c 2009--c

1810----@ 1860-------B 1910----a 1960-----A 2010--c

1811--------C 1861-----A 1911--b 1961---------D 2011-------B

1812---b 1862----------F 1912-------C 1962---a 2012-d

1813-----A 1863--c 1913---------D 1963------B 2013------B

1814--------C 1864-e 1914--b 1964----a 2014----@

1815--------C 1865-------B 1915----------E 1965h 2015h

1816--------C 1866--------C 1916--------C 1966o 2016------A

1817---------D 1867--------C 1917-----A 1967--b

1818----------H 1868----------G 1918-e 1968----a

1819------A 1869----------E 1919-e 1969-------B

1820------B 1870-----A 1920---a 1970---a

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

1822--b 1872h 1922-------B 1972-e

1773----------H 1823-----@ 1873j 1923----------E 1973---------D

1774-c 1824------B 1874-d 1924--------C 1974---------D

1775---a 1825----------F 1875---b 1925----a 1975--------C

1776----------E 1826---------D 1876------A 1926----@ 1976------A

1777--b 1827---b 1877----------E 1927---------D 1977--b

1778-----@ 1828----------E 1878--------C 1928--------C 1978-----A

1779---------D 1829---a 1879-------C 1929-----@ 1979--b

1780------B 1830---------E 1880-------B 1930g 1980----------F

1781--------D 1831--b 1881--b 1931-e 1981---------D

1782-----@ 1832-------B 1882----------F 1932-------B 1982-------B

1783------A 1833---b 1883--------C 1933---b 1983----------E

1784---b 1834q 1884---b 1934-d 1984----a

1785-d 1835g 1885-------B 1935------A 1985------B

1786-e 1836---a 1886------B 1936i 1986---b

1787h 1837--b 1887-----@ 1937-c 1987-e

1788---b 1838------A 1888-----@ 1938--------C 1988i

1789-c 1839-c 1889--------C 1939-----@ 1989h

1790f 1840---a 1890------A 1940------A 1990-d

1791--c 1841---a 1891---------D 1941-------C 1991----@

1792--------C 1842--b 1892---------D 1942---------D 1992-----@

1793----------G 1843-e 1893-----@ 1943--------C 1993--b

1794----------G 1844h 1894-c 1944--c 1994----@

1795----------E 1845g 1895-e 1945-e 1995--------C

1796-----A 1846f 1896--c 1946-----A 1996----@

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

1798--------C 1848-------C 1898--c 1948--b 1998----------F

1799------A 1849--------C 1899----@ 1949----------E 1999----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: 16:57 Fri 12 Jan 2018 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

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1 RNT01A 1890 2016 .81 .62 .41 .53 .61

2 RNT02A 1873 2016 .62 .64 .70 .73 .79 .79

3 RNT02B 1893 2016 .74 .85 .85 .62 .54

4 RNT03B 1879 2016 .68 .74 .72 .66 .57

5 RNT04A 1884 2016 .54 .70 .66 .64 .75

6 RNT04B 1890 2016 .64 .68 .71 .80 .84

7 RNT05A 1914 2016 .78 .81 .72 .60

8 RNT05B 1926 2016 .74 .73 .69

9 RNT06A 1893 2016 .59 .48 .56 .68 .76

10 RNT06B 1888 2016 .58 .70 .65 .71 .79

11 RNT07A 1885 2016 .69 .72 .73 .76 .80

12 RNT07B 1901 2016 .25A .68 .73 .53

13 RNT08A 1903 2016 .81 .80 .78 .83

14 RNT08B 1905 2016 .61 .65 .69 .71

15 RNT09A 1773 2016 .74 .79 .74 .44B .29B .65 .64 .65 .75

16 RNT09B 1779 2016 .74 .79 .65 .44B .45 .62 .75 .80 .75

17 RNT10A 1884 2016 .68 .72 .71 .73 .76

18 RNT10B 1892 2016 .78 .78 .76 .69 .65

Av segment correlation .74 .79 .70 .50 .62 .67 .70 .71 .71

PART 6: POTENTIAL PROBLEMS: 16:57 Fri 12 Jan 2018 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

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

RNT01A 1890 to 2016 127 years Series 1

[B] Entire series, effect on correlation ( .575) is:

Lower 1948< -.035 1949< -.031 2009> -.014 1962> -.011 1959> -.008 1973< -.008 Higher 1930 .011 1936 .011

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

1931 -5.1 SD; 1949 -7.1 SD; 1962 +3.1 SD; 1966 +3.3 SD; 1978 +3.5 SD

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

RNT02A 1873 to 2016 144 years Series 2

[B] Entire series, effect on correlation ( .685) is:

Lower 1873< -.028 1966> -.021 2001< -.018 1948> -.012 1880> -.010 1938< -.006 Higher 1988 .010 1998 .007

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

1880 +3.0 SD; 1966 +4.6 SD

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RNT02B 1893 to 2016 124 years Series 3

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

Lower 2012> -.020 1985< -.019 1980< -.012 1895> -.012 1987> -.011 1988< -.006 Higher 1965 .014 1936 .007

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

1895 +3.4 SD; 1966 +3.3 SD; 1987 +3.4 SD; 1988 -5.6 SD

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RNT03A 1 894 to 1016 123 years Series 4

[\*] Series cannot be checked; no overlap with any other series

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RNT03B 1879 to 2016 138 years Series 4

[B] Entire series, effect on correlation ( .632) is:

Lower 1996> -.014 2009> -.011 2010> -.010 1997< -.009 1965> -.009 1883< -.009 Higher 1936 .023 1966 .020

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

1937 -5.1 SD; 1996 +4.0 SD; 2010 +3.4 SD

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RNT04A 1884 to 2016 133 years Series 5

[B] Entire series, effect on correlation ( .614) is:

Lower 1958< -.020 1895> -.017 1916< -.016 1900< -.016 1948> -.015 1961< -.014 Higher 1936 .018 1965 .012

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

1895 +3.2 SD; 1900 -6.3 SD; 1948 +3.3 SD

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RNT04B 1890 to 2016 127 years Series 6

[B] Entire series, effect on correlation ( .743) is:

Lower 1954< -.020 1900> -.019 2004< -.012 1965> -.009 1905< -.007 1936> -.006 Higher 1966 .021 2015 .008

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

1900 +3.5 SD

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

RNT05A 1914 to 2016 103 years Series 7

[B] Entire series, effect on correlation ( .718) is:

Lower 2007< -.021 2012> -.021 1919> -.009 1984> -.009 1998< -.008 1948> -.006 Higher 1966 .030 1936 .024

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RNT05B 1926 to 2016 91 years Series 8

[B] Entire series, effect on correlation ( .712) is:

Lower 1963< -.011 1939< -.011 1929> -.011 1965> -.010 1938< -.008 2012> -.007 Higher 1966 .034 1936 .023

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RNT06A 1893 to 2016 124 years Series 9

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

Lower 1943< -.078 1900> -.019 1896> -.015 1959> -.014 1948> -.008 1951< -.008 Higher 1966 .026 2015 .017

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

1896 +4.2 SD; 1900 +4.0 SD; 1943 -6.9 SD

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RNT06B 1888 to 2016 129 years Series 10

[B] Entire series, effect on correlation ( .660) is:

Lower 1964< -.033 1895> -.025 1943< -.022 1888< -.009 1936> -.008 1898> -.008 Higher 1966 .022 1965 .018

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

1895 +4.6 SD

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RNT07A 1885 to 2016 132 years Series 11

[B] Entire series, effect on correlation ( .724) is:

Lower 1948> -.014 1890< -.012 1981< -.010 2011< -.009 2009> -.009 1947< -.009 Higher 2015 .010 1980 .009

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

1936 -6.3 SD

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RNT07B 1901 to 2016 116 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

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

1901 1950 0 -.19 -.15 .14 -.14 -.10 .12 -.06 -.05 -.09 .19 .25\*-.10 -.10 .14 -.07 -.12 .08 .04 -.08 -.01 -.04

[B] Entire series, effect on correlation ( .440) is:

Lower 1915< -.058 1914> -.024 2015> -.022 1912< -.020 2010< -.018 1904> -.015 Higher 1965 .031 1936 .023

1901 to 1950 segment:

Lower 1915< -.131 1914> -.058 1912< -.042 1904> -.036 1901< -.021 1908> -.019 Higher 1936 .091 1930 .051

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

1914 1915 -4.5 SD

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

1904 +3.1 SD; 1914 +3.9 SD; 1915 -5.3 SD; 1966 +3.1 SD; 2010 -4.7 SD; 2015 +4.4 SD

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RNT08A 1903 to 2016 114 years Series 13

[B] Entire series, effect on correlation ( .807) is:

Lower 1959< -.015 1954> -.009 1904< -.006 1972> -.006 1919> -.005 1951< -.005 Higher 1966 .013 1965 .011

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

1954 +3.1 SD

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RNT08B 1905 to 2016 112 years Series 14

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

Lower 1948> -.030 1916< -.016 1953< -.016 1964> -.008 1957< -.008 2009> -.006 Higher 1936 .022 1966 .015

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

1948 +4.0 SD; 2015 -6.3 SD

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RNT09A 1773 to 2016 244 years Series 15

[\*] Early part of series cannot be checked from 1773 to 1778 -- 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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1850 1899 1 -.19 .13 .07 -.12 .03 -.35 -.29 -.01 -.02 .13 .44| .45\* .09 .16 -.11 -.37 .01 -.17 .11 .12 .18

1875 1924 -1 -.07 -.18 -.07 -.26 -.04 -.24 -.09 -.03 .05 .35\* .29| .15 -.08 -.04 -.05 -.06 .05 -.17 .21 .04 .04

[B] Entire series, effect on correlation ( .655) is:

Lower 1874> -.021 1958< -.013 1883> -.010 1936> -.008 1960< -.005 2007> -.004 Higher 1834 .027 1965 .007

1850 to 1899 segment:

Lower 1874> -.100 1883> -.053 1875< -.018 1881> -.018 1889< -.018 1892< -.017 Higher 1863 .058 1873 .048

1875 to 1924 segment:

Lower 1883> -.074 1881> -.028 1906< -.027 1904> -.026 1889< -.025 1892< -.024 Higher 1918 .058 1915 .049

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

1874 +4.9 SD; 1883 +3.2 SD; 1884 +3.1 SD; 1904 +3.2 SD

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RNT09B 1779 to 2016 238 years Series 16

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

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

1850 1899 -1 .12 -.01 -.06 -.13 -.20 -.40 -.02 -.03 .07 .50\* .44| .15 .01 .02 -.17 -.29 .08 .03 -.09 .36 .09

[B] Entire series, effect on correlation ( .667) is:

Lower 1873> -.022 1874< -.021 1900> -.013 1948< -.008 1892< -.005 1959> -.004 Higher 1834 .017 1966 .013

1850 to 1899 segment:

Lower 1874< -.107 1873> -.087 1892< -.023 1853> -.012 1878> -.011 1864< -.010 Higher 1863 .058 1868 .032

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

1873 1874 -5.3 SD

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

1834 +3.4 SD; 1873 +5.0 SD; 1874 -4.7 SD; 1900 +4.0 SD

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

RNT10A 1884 to 2016 133 years Series 17

[B] Entire series, effect on correlation ( .721) is:

Lower 1914> -.014 1962< -.011 2007> -.008 1966> -.007 1953< -.006 1945> -.005 Higher 1936 .010 1930 .009

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

1914 +3.0 SD; 2007 +3.4 SD

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RNT10B 1892 to 2016 125 years Series 18

[B] Entire series, effect on correlation ( .725) is:

Lower 1972< -.025 1977> -.012 2002< -.009 1960< -.006 1901< -.005 1996< -.005 Higher 1936 .015 1966 .010

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

1972 -5.4 SD; 1977 +3.1 SD

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PART 7: DESCRIPTIVE STATISTICS: 16:57 Fri 12 Jan 2018 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 RNT01A 1890 2016 127 5 0 .575 2.00 8.23 1.367 .727 .356 2.75 .394 .023 1

2 RNT02A 1873 2016 144 6 0 .685 2.71 6.39 1.170 .526 .341 2.60 .421 .033 1

3 RNT02B 1893 2016 124 5 0 .666 3.25 6.58 1.251 .339 .364 2.59 .395 .093 2

4 RNT03B 1879 2016 138 5 0 .632 1.72 7.89 1.495 .807 .316 2.65 .404 -.039 1

5 RNT04A 1884 2016 133 5 0 .614 3.32 14.46 2.515 .780 .403 2.61 .429 .014 1

6 RNT04B 1890 2016 127 5 0 .743 3.69 13.57 2.172 .786 .319 2.68 .374 -.006 1

7 RNT05A 1914 2016 103 4 0 .718 4.02 7.82 1.642 .693 .304 2.43 .401 -.015 1

8 RNT05B 1926 2016 91 3 0 .712 3.88 7.06 1.544 .681 .297 2.47 .401 -.025 1

9 RNT06A 1893 2016 124 5 0 .589 2.12 10.66 1.684 .670 .338 3.07 .473 .061 1

10 RNT06B 1888 2016 129 5 0 .660 2.46 12.31 2.277 .788 .354 2.78 .496 .101 1

11 RNT07A 1885 2016 132 5 0 .724 2.53 6.25 1.334 .708 .324 2.74 .344 -.020 1

12 RNT07B 1901 2016 116 4 1 .440 3.01 8.94 1.750 .795 .307 2.77 .495 .055 1

13 RNT08A 1903 2016 114 4 0 .807 3.32 10.35 1.956 .747 .341 2.81 .555 .043 1

14 RNT08B 1905 2016 112 4 0 .661 2.59 8.28 1.477 .511 .403 2.61 .384 -.044 1

15 RNT09A 1773 2016 244 9 2 .655 1.34 5.54 .870 .778 .294 2.79 .407 -.033 1

16 RNT09B 1779 2016 238 9 1 .667 1.18 4.30 .673 .673 .302 2.87 .488 .028 1

17 RNT10A 1884 2016 133 5 0 .721 3.20 8.04 1.497 .607 .327 2.90 .545 -.053 1

18 RNT10B 1892 2016 125 5 0 .725 2.87 8.85 1.508 .575 .381 2.66 .456 -.024 1

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Total or mean: 2577 93 4 .633 2.54 14.46 1.473 .680 .334 3.07 .441 .009

- = [ COFECHA RNT COF ] = -