[] Dendrochronology Program Library Run ABP20 Program COF 15:19 Mon 21 Feb 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27812

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: ABP20

File of DATED series: c:\vermont\ABP69

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 40 years lagged successively by 10 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 .3665

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 1828 to 2010 183 years

Continuous time span is 1828 to 2010 183 years

Portion with two or more series is 1829 to 2010 182 years

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

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

\*O\* Master series 1828 2010 183 yrs \*O\*

\*F\* Total rings in all series 2754 \*F\*

\*E\* Total dated rings checked 2753 \*E\*

\*C\* Series intercorrelation .614 \*C\*

\*H\* Average mean sensitivity .254 \*H\*

\*A\* Segments, possible problems 14 \*A\*

\*\*\* Mean length of series 144.9 \*\*\*

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

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

ABP10A 1 absent rings: 1918

ABP12 1 absent rings: 1914

ABP15 1 absent rings: 1923

3 absent rings .109%

PART 2: TIME PLOT OF TREE-RING SERIES: ABP20 15:19 Mon 21 Feb 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

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

. . . . . . . . . . . . . . . . . <============> . ABP01 1 1881 2010 130

. . . . . . . . . . . . . . . . <==================> . ABP02 2 1829 2010 182

. . . . . . . . . . . . . . . . <================> . ABP03 3 1844 2010 167

. . . . . . . . . . . . . . . . . <==========> . ABP04 4 1900 2010 111

. . . . . . . . . . . . . . . . . <============> . ABP05 5 1883 2010 128

. . . . . . . . . . . . . . . . . <=============> . ABP06 6 1870 2010 141

. . . . . . . . . . . . . . . . . <=============> . ABP07 7 1871 2010 140

. . . . . . . . . . . . . . . . <================> . ABP09 8 1849 2010 162

. . . . . . . . . . . . . . . . .<==============> . ABP10A 9 1860 2010 151

. . . . . . . . . . . . . . . . .<==============> . ABP11 10 1866 2010 145

. . . . . . . . . . . . . . . . . <============> . ABP12 11 1882 2010 129

. . . . . . . . . . . . . . . . <===============> . ABP13 12 1852 2010 159

. . . . . . . . . . . . . . . . <==================> . ABP14 13 1828 2010 183

. . . . . . . . . . . . . . . . .<==============> . ABP15 14 1860 2010 151

. . . . . . . . . . . . . . . . <=================> . ABP16 15 1834 2010 177

. . . . . . . . . . . . . . . . . . <========> . ABP17 16 1924 2010 87

. . . . . . . . . . . . . . . . <===============> . ABP18 17 1858 2010 153

. . . . . . . . . . . . . . . . . <==========> . ABP19 18 1902 2010 109

. . . . . . . . . . . . . . . . .<==============> . ABP20 19 1862 2010 149

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

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: ABP20 15:19 Mon 21 Feb 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 1.015 5 1900 -1.272 17 1950 -1.625 19 2000 -2.168 19

1851 1.896 5 1901 -.075 17 1951 .738 19 2001 .580 19

1852 -.437 6 1902 1.182 18 1952 1.358 19 2002 -.168 19

1853 -.684 6 1903 1.326 18 1953 -.375 19 2003 -1.329 19

1854 .116 6 1904 .740 18 1954 .268 19 2004 -.627 19

1855 -.049 6 1905 1.299 18 1955 1.229 19 2005 1.177 19

1856 -1.024 6 1906 .804 18 1956 -.104 19 2006 -.554 19

1857 .536 6 1907 .047 18 1957 1.020 19 2007 -.377 19

1858 1.650 7 1908 -1.027 18 1958 -.264 19 2008 .029 19

1859 .759 7 1909 -.725 18 1959 1.078 19 2009 1.174 19

1860 1.325 9 1910 .797 18 1960 -1.772 19 2010 .666 19

1861 1.242 9 1911 -.724 18 1961 1.099 19

1862 -1.310 10 1912 -1.234 18 1962 -1.992 19

1863 -.053 10 1913 .432 18 1963 -.861 19

1864 -.642 10 1914 -1.509 18 1 1964 .329 19

1865 -.131 10 1915 .014 18 1965 -1.879 19

1866 .899 11 1916 .145 18 1966 -.422 19

1867 1.127 11 1917 -.064 18 1967 1.705 19

1868 .096 11 1918 -1.788 18 1 1968 .774 19

1869 -.785 11 1919 .331 18 1969 2.029 19

1870 -.988 12 1920 -.688 18 1970 -.420 19

1871 -.431 13 1921 -.791 18 1971 .063 19

1872 -.262 13 1922 -.333 18 1972 -1.197 19

1873 -.483 13 1923 -1.641 18 1 1973 .674 19

1874 .386 13 1924 .402 19 1974 -.507 19

1875 -1.076 13 1925 1.378 19 1975 -.130 19

1876 -.699 13 1926 1.224 19 1976 -.259 19

1877 -1.042 13 1927 .851 19 1977 -.985 19

1828 1.284 1 1878 1.131 13 1928 .621 19 1978 .706 19

1829 -.178 2 1879 -.537 13 1929 1.204 19 1979 .746 19

1830 1.582 2 1880 .526 13 1930 1.736 19 1980 .271 19

1831 -.346 2 1881 -.367 14 1931 .465 19 1981 -.982 19

1832 -1.386 2 1882 1.352 15 1932 .784 19 1982 -.354 19

1833 .725 2 1883 .073 16 1933 -1.401 19 1983 .805 19

1834 .940 3 1884 -.190 16 1934 -1.698 19 1984 -.480 19

1835 .501 3 1885 -.367 16 1935 -1.286 19 1985 1.380 19

1836 -1.257 3 1886 .184 16 1936 .387 19 1986 1.858 19

1837 -.790 3 1887 -.307 16 1937 .622 19 1987 .926 19

1838 -.394 3 1888 -.457 16 1938 .687 19 1988 -2.330 19

1839 -.831 3 1889 .724 16 1939 -.355 19 1989 -.418 19

1840 -.783 3 1890 -.218 16 1940 -.468 19 1990 1.061 19

1841 -1.141 3 1891 1.020 16 1941 -1.185 19 1991 .736 19

1842 .127 3 1892 1.359 16 1942 -.958 19 1992 .196 19

1843 -2.065 3 1893 1.280 16 1943 .364 19 1993 -1.091 19

1844 .263 4 1894 -.003 16 1944 -.116 19 1994 -1.223 19

1845 .524 4 1895 -1.726 16 1945 .577 19 1995 -1.714 19

1846 -.568 4 1896 -1.385 16 1946 .849 19 1996 1.037 19

1847 -.069 4 1897 .901 16 1947 1.425 19 1997 .427 19

1848 2.014 4 1898 .227 16 1948 -.999 19 1998 1.324 19

1849 .117 5 1899 -2.432 16 1949 -1.567 19 1999 .347 19

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PART 4: Master Bar Plot: ABP20 15:19 Mon 21 Feb 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--------D 1900-e 1950f 2000i

1851----------H 1901-----@ 1951-------C 2001-------B

1852---b 1902---------E 1952---------E 2002----a

1853--c 1903---------E 1953---a 2003-e

1854-----@ 1904-------C 1954------A 2004--c

1855-----@ 1905---------E 1955---------E 2005---------E

1856-d 1906--------C 1956-----@ 2006---b

1857-------B 1907-----@ 1957---------D 2007---b

1858----------G 1908-d 1958----a 2008-----@

1859--------C 1909--c 1959---------D 2009---------E

1860---------E 1910--------C 1960g 2010-------C

1861---------E 1911--c 1961---------D

1862-e 1912-e 1962h

1863-----@ 1913------B 1963--c

1864--c 1914f 1964------A

1865----a 1915-----@ 1965h

1866--------D 1916-----A 1966---b

1867---------E 1917-----@ 1967----------G

1868-----@ 1918g 1968--------C

1869--c 1919------A 1969----------H

1870--d 1920--c 1970---b

1871---b 1921--c 1971-----@

1872----a 1922----a 1972-e

1873---b 1923g 1973-------C

1874------B 1924------B 1974---b

1875-d 1925---------F 1975----a

1876--c 1926---------E 1976----a

1877-d 1927--------C 1977--d

1828---------E 1878---------E 1928-------B 1978-------C

1829----a 1879---b 1929---------E 1979-------C

1830----------F 1880-------B 1930----------G 1980------A

1831----a 1881---a 1931------B 1981--d

1832-f 1882---------E 1932--------C 1982----a

1833-------C 1883-----@ 1933-f 1983--------C

1834--------D 1884----a 1934g 1984---b

1835-------B 1885---a 1935-e 1985---------F

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

1837--c 1887----a 1937-------B 1987--------D

1838---b 1888---b 1938-------C 1988i

1839--c 1889-------C 1939----a 1989---b

1840--c 1890----a 1940---b 1990---------D

1841-e 1891---------D 1941-e 1991-------C

1842-----A 1892---------E 1942--d 1992------A

1843h 1893---------E 1943------A 1993-d

1844------A 1894-----@ 1944-----@ 1994-e

1845-------B 1895g 1945-------B 1995g

1846---b 1896-f 1946--------C 1996---------D

1847-----@ 1897--------D 1947----------F 1997------B

1848----------H 1898------A 1948-d 1998---------E

1849-----@ 1899j 1949f 1999------A

PART 5: CORRELATION OF SERIES BY SEGMENTS: ABP20 15:19 Mon 21 Feb 2011 Page 5

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Correlations of 40-year dated segments, lagged 10 years

Flags: A = correlation under .3665 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1820 1830 1840 1850 1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980

1859 1869 1879 1889 1899 1909 1919 1929 1939 1949 1959 1969 1979 1989 1999 2009 2019

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

1 ABP01 1881 2010 .52 .64 .72 .64 .65 .69 .60 .73 .72 .67 .67

2 ABP02 1829 2010 .33A .45 .41 .33B .47 .56 .64 .71 .65 .59 .68 .78 .76 .78 .78 .77 .76

3 ABP03 1844 2010 .23B .28B .55 .66 .79 .74 .63 .57 .58 .69 .66 .76 .76 .51 .50

4 ABP04 1900 2010 .10B .24B .32A .73 .69 .71 .72 .63 .62

5 ABP05 1883 2010 .43 .54 .53 .53 .66 .72 .77 .79 .82 .77 .74

6 ABP06 1870 2010 .64 .69 .69 .68 .64 .62 .62 .57 .54 .52 .44 .42

7 ABP07 1871 2010 .32A .63 .67 .68 .69 .74 .75 .48 .52 .48 .43 .43

8 ABP09 1849 2010 .46 .49 .52 .41 .31A .40B .39B .63 .80 .81 .79 .78 .75 .75 .75

9 ABP10A 1860 2010 .66 .55 .36A .42 .23B .34B .55 .66 .72 .76 .77 .63 .62

10 ABP11 1866 2010 .70 .73 .70 .73 .68 .60 .63 .65 .62 .68 .70 .55 .52

11 ABP12 1882 2010 .67 .70 .67 .69 .73 .80 .81 .85 .87 .84 .84

12 ABP13 1852 2010 .40 .45 .40 .53 .67 .65 .67 .50 .64 .66 .67 .80 .56 .56

13 ABP14 1828 2010 .42 .53 .61 .56 .68 .62 .75 .82 .81 .73 .71 .82 .78 .81 .77 .69 .71

14 ABP15 1860 2010 .61 .60 .51 .55 .46 .45 .55 .68 .69 .75 .70 .55 .51

15 ABP16 1834 2010 .49 .47 .55 .55 .55 .61 .65 .59 .63 .59 .74 .74 .67 .65 .55 .53

16 ABP17 1924 2010 .66 .73 .69 .73 .66 .41 .42

17 ABP18 1858 2010 .64 .71 .76 .76 .81 .70 .73 .70 .71 .72 .68 .68 .55 .54

18 ABP19 1902 2010 .70 .62 .61 .74 .71 .84 .85 .72 .70

19 ABP20 1862 2010 .54 .65 .75 .76 .77 .71 .69 .84 .81 .87 .86 .78 .79

Av segment correlation .37 .49 .44 .46 .59 .57 .60 .66 .59 .59 .63 .73 .70 .73 .73 .62 .61

PART 6: POTENTIAL PROBLEMS: ABP20 15:19 Mon 21 Feb 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 40-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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ABP01 1881 to 2010 130 years Series 1

[B] Entire series, effect on correlation ( .646) is:

Lower 1949> -.016 1974> -.014 1893< -.011 1889< -.010 1984> -.008 1909< -.008 Higher 1988 .021 2000 .018

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

ABP02 1829 to 2010 182 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

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

1829 1868 0 - - - - - - - - - -.15 .33\*-.13 .00 .19 -.07 -.30 -.07 .04 -.07 .25 .12

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

1850 1889 9 -.02 .10 -.20 .10 .20 -.36 -.26 -.08 -.14 -.15 .33|-.19 .08 .08 .11 -.14 .09 .09 .15 .34\* .09

[B] Entire series, effect on correlation ( .627) is:

Lower 1829< -.022 1948> -.012 1836> -.012 1982< -.011 1875> -.010 1877> -.009 Higher 1988 .020 2000 .015

1829 to 1868 segment:

Lower 1829< -.109 1836> -.045 1846> -.042 1860< -.036 1844< -.032 1833> -.029 Higher 1843 .080 1848 .050

1850 to 1889 segment:

Lower 1875> -.061 1877> -.058 1860< -.049 1867< -.030 1876> -.022 1873> -.022 Higher 1851 .056 1878 .036

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

1833 +3.0 SD

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ABP03 1844 to 2010 167 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

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

1844 1883 9 .11 .09 -.11 .01 .14 -.05 .11 .02 .08 -.36 .23|-.12 .04 -.16 .14 -.19 .10 .10 .22 .24\* .22

1850 1889 8 -.05 .08 -.09 .04 .08 -.07 .14 -.04 .03 -.37 .28|-.14 .17 -.22 .15 -.11 .02 .06 .35\* .15 -.01

[B] Entire series, effect on correlation ( .554) is:

Lower 2000> -.031 1879< -.013 1948> -.011 2007< -.010 1846< -.009 1974> -.009 Higher 1988 .024 1899 .021

1844 to 1883 segment:

Lower 1856> -.029 1873> -.028 1870> -.024 1866< -.023 1855> -.020 1861< -.016 Higher 1862 .038 1879 .034

1850 to 1889 segment:

Lower 1856> -.032 1866< -.030 1873> -.029 1870> -.026 1861< -.022 1855> -.021 Higher 1862 .038 1858 .029

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

2000 +3.2 SD

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ABP04 1900 to 2010 111 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 1939 8 -.11 -.22 -.11 .06 -.05 .08 -.14 .18 .09 -.15 .10|-.08 -.03 -.40 -.18 -.20 .09 .20 .29\* .06 .07

1910 1949 8 -.06 -.09 -.05 .05 -.08 .11 -.11 .07 .05 -.29 .24|-.09 -.06 -.38 -.13 -.12 .01 .16 .27\* .11 .15

1920 1959 0 -.02 -.04 .05 .11 -.11 .24 -.08 .12 .11 -.24 .32\*-.10 -.09 -.35 -.17 -.10 -.18 .17 .06 -.01 .10

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

Lower 1926< -.044 1925< -.039 1910< -.023 1981> -.016 1914> -.011 2009< -.011 Higher 1988 .041 2000 .039

1900 to 1939 segment:

Lower 1926< -.103 1925< -.097 1910< -.055 1902< -.024 1908> -.021 1914> -.016 Higher 1933 .057 1923 .042

1910 to 1949 segment:

Lower 1926< -.115 1925< -.104 1910< -.060 1914> -.023 1918> -.019 1942> -.017 Higher 1948 .069 1933 .039

1920 to 1959 segment:

Lower 1926< -.129 1925< -.116 1942> -.023 1956> -.020 1940> -.019 1952< -.013 Higher 1948 .077 1933 .044

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

1926 -5.6 SD

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ABP05 1883 to 2010 128 years Series 5

[B] Entire series, effect on correlation ( .617) is:

Lower 1918< -.050 1883> -.014 1889< -.014 1942> -.010 1900> -.009 1960> -.008 Higher 2000 .023 1988 .012

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

1918 -6.9 SD

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ABP06 1870 to 2010 141 years Series 6

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

Lower 1965> -.019 2000> -.015 1870> -.012 1890< -.011 1999< -.010 1973< -.010 Higher 1960 .022 1899 .022

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ABP07 1871 to 2010 140 years Series 7

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

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

1871 1910 0 .31 .26 -.11 -.35 .00 .05 .09 -.20 -.07 .23 .32\* .11 -.25 .08 -.26 .28 -.18 -.17 -.40 .28 .03

[B] Entire series, effect on correlation ( .527) is:

Lower 1973< -.067 1874< -.020 1875> -.020 1995> -.014 1873> -.014 1878< -.011 Higher 1914 .016 1960 .015

1871 to 1910 segment:

Lower 1875> -.077 1874< -.069 1873> -.048 1878< -.042 1877> -.030 1876> -.012 Higher 1899 .068 1892 .033

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

1972 1973 -4.3 SD

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ABP09 1849 to 2010 162 years Series 8

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

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

1880 1919 0 -.23 -.26 -.20 -.11 .10 -.18 .29 .09 .18 .16 .31\*-.07 -.16 -.14 -.15 -.03 -.12 .06 -.05 .04 -.07

1890 1929 -1 -.14 -.13 -.40 -.15 .08 -.02 .18 .32 .15 .46\* .40| .04 -.19 -.12 -.24 -.13 -.22 -.09 -.09 .05 .11

1900 1939 -1 -.11 -.30 -.36 -.17 .17 .01 .02 .27 .17 .42\* .39| .18 .03 -.12 -.38 -.25 -.10 -.02 -.05 -.05 .07

[B] Entire series, effect on correlation ( .622) is:

Lower 1902< -.016 1855< -.016 1914> -.015 1883< -.013 1877< -.012 1910< -.008 Higher 2000 .019 1988 .012

1880 to 1919 segment:

Lower 1902< -.069 1914> -.048 1883< -.041 1910< -.035 1901< -.024 1895> -.020 Higher 1899 .114 1911 .023

1890 to 1929 segment:

Lower 1902< -.077 1914> -.054 1910< -.038 1901< -.029 1895> -.024 1913< -.022 Higher 1899 .105 1923 .028

1900 to 1939 segment:

Lower 1902< -.075 1914> -.071 1910< -.036 1935> -.034 1901< -.025 1913< -.020 Higher 1933 .049 1930 .048

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ABP10A 1860 to 2010 151 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

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

1880 1919 0 -.44 .14 -.03 -.15 -.29 .16 .22 -.08 -.15 .19 .36\* .22 -.09 -.10 -.03 .19 -.09 .01 .05 -.08 .11

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

1900 1939 1 -.31 -.09 -.11 -.04 -.17 .12 .09 -.15 .04 .07 .23| .39\* .08 -.11 .10 .29 .11 .17 .12 -.29 .05

1910 1949 1 -.29 -.07 -.26 .16 .10 .15 .04 -.25 -.05 .03 .34| .39\* .16 -.14 -.05 .20 -.01 .07 .20 -.16 .19

[B] Entire series, effect on correlation ( .584) is:

Lower 1913< -.036 2000> -.023 1883> -.011 1938< -.009 1880< -.009 1903< -.008 Higher 1899 .018 1948 .012

1880 to 1919 segment:

Lower 1913< -.106 1883> -.037 1914> -.026 1895> -.026 1880< -.025 1903< -.024 Higher 1918 .091 1899 .086

1900 to 1939 segment:

Lower 1913< -.119 1938< -.028 1903< -.027 1914> -.018 1939> -.014 1920> -.010 Higher 1918 .141 1902 .021

1910 to 1949 segment:

Lower 1913< -.113 1938< -.027 1914> -.024 1939> -.013 1923> -.013 1911> -.012 Higher 1918 .092 1948 .064

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

1918 -1.788 18 1

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

1913 -4.6 SD

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

ABP11 1866 to 2010 145 years Series 10

[B] Entire series, effect on correlation ( .625) is:

Lower 1987< -.017 1972> -.016 1918> -.012 2006> -.011 2004> -.010 1935> -.007 Higher 1988 .025 1962 .015

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

ABP12 1882 to 2010 129 years Series 11

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

Lower 1914< -.024 1904< -.016 1912> -.009 1939> -.009 1890> -.008 1944< -.006 Higher 1962 .009 1899 .006

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

1914 -1.509 18 1

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

ABP13 1852 to 2010 159 years Series 12

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

Lower 1954< -.042 2003> -.019 1897< -.011 1880< -.011 1911> -.008 1879> -.007 Higher 1960 .018 1988 .014

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

1954 -5.1 SD; 2003 +3.2 SD

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ABP14 1828 to 2010 183 years Series 13

[\*] Early part of series cannot be checked from 1828 to 1828 -- not matched by another series

[B] Entire series, effect on correlation ( .675) is:

Lower 1829> -.024 1981> -.019 1948> -.014 1833< -.010 1839> -.008 1888> -.006 Higher 1962 .013 1988 .013

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

1829 +3.6 SD; 1981 +3.5 SD

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

ABP15 1860 to 2010 151 years Series 14

[B] Entire series, effect on correlation ( .531) is:

Lower 1923< -.038 1948> -.015 1996< -.011 1903< -.010 1981> -.010 1918> -.010 Higher 1899 .017 1962 .011

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

1922 1923 -4.3 SD 1923 1924 4.3 SD

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

1923 -1.641 18 1

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

1923 -7.7 SD

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ABP16 1834 to 2010 177 years Series 15

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

Lower 1862< -.030 1988> -.016 1883< -.013 1921> -.010 1846> -.010 2009< -.007 Higher 1962 .014 2000 .013

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

1862 -4.6 SD

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ABP17 1924 to 2010 87 years Series 16

[B] Entire series, effect on correlation ( .564) is:

Lower 1948> -.032 2007< -.023 2006> -.014 2000> -.012 1970> -.011 1991< -.009 Higher 1960 .036 1962 .025

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ABP18 1858 to 2010 153 years Series 17

[B] Entire series, effect on correlation ( .659) is:

Lower 2006< -.022 1981> -.008 2007> -.007 1876< -.007 1865> -.006 1980< -.006 Higher 1899 .018 1948 .009

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ABP19 1902 to 2010 109 years Series 18

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

Lower 1948> -.034 1902< -.012 1942< -.011 1988> -.007 1978< -.007 1909> -.007 Higher 2000 .016 1962 .009

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ABP20 1862 to 2010 149 years Series 19

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

Lower 1921> -.012 1875< -.010 1862> -.010 1948> -.008 1881< -.006 1923> -.006 Higher 1988 .011 1960 .011

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PART 7: DESCRIPTIVE STATISTICS: ABP20 15:19 Mon 21 Feb 2011 Page 6

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

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

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

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

1 ABP01 1881 2010 130 11 0 .646 1.59 3.68 .662 .748 .233 2.56 .430 -.060 1

2 ABP02 1829 2010 182 17 2 .627 1.34 3.40 .561 .832 .204 2.64 .404 -.023 1

3 ABP03 1844 2010 167 15 2 .554 1.29 3.21 .556 .741 .229 2.54 .475 -.005 1

4 ABP04 1900 2010 111 9 3 .494 1.42 5.47 1.053 .870 .259 2.61 .422 .056 2

5 ABP05 1883 2010 128 11 0 .617 1.80 4.00 .727 .624 .246 2.50 .313 -.004 1

6 ABP06 1870 2010 141 12 0 .572 1.37 4.30 .676 .807 .215 2.55 .430 -.016 1

7 ABP07 1871 2010 140 12 1 .527 1.71 4.98 .816 .747 .290 2.69 .482 .031 1

8 ABP09 1849 2010 162 15 3 .622 1.05 3.25 .533 .678 .302 2.78 .488 -.021 1

9 ABP10A 1860 2010 151 13 3 .584 1.15 3.21 .658 .825 .255 2.60 .437 .021 1

10 ABP11 1866 2010 145 13 0 .625 1.44 4.68 .713 .744 .252 2.66 .419 .035 1

11 ABP12 1882 2010 129 11 0 .747 1.28 3.28 .585 .733 .291 2.43 .347 -.058 1

12 ABP13 1852 2010 159 14 0 .587 1.07 2.61 .468 .800 .249 2.56 .428 -.078 1

13 ABP14 1828 2010 183 17 0 .675 1.17 2.91 .501 .778 .228 2.69 .434 -.029 2

14 ABP15 1860 2010 151 13 0 .531 1.99 6.48 1.073 .775 .281 2.49 .280 -.024 3

15 ABP16 1834 2010 177 16 0 .575 1.94 5.30 .854 .693 .270 2.47 .322 -.056 1

16 ABP17 1924 2010 87 7 0 .564 2.52 4.64 .812 .598 .230 2.80 .598 -.064 1

17 ABP18 1858 2010 153 14 0 .659 1.28 3.57 .618 .718 .280 2.72 .442 -.055 1

18 ABP19 1902 2010 109 9 0 .710 1.63 2.80 .500 .470 .256 2.61 .459 -.075 1

19 ABP20 1862 2010 149 13 0 .731 1.93 3.54 .676 .545 .271 2.74 .536 .018 1

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Total or mean: 2754 242 14 .614 1.49 6.48 .677 .729 .254 2.80 .425 -.021

- = [ COFECHA ABP20COF ] = -