[] Dendrochronology Program Library Run BLT Program COF 16:32 Thu 06 Mar 2014 Page 1

[]

[] P R O G R A M C O F E C H A Version 6.06P 28921

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

QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Run6

File of DATED series: BLTLow\_ACSH\_6

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 1891 to 2012 122 years

Continuous time span is 1891 to 2012 122 years

Portion with two or more series is 1900 to 2012 113 years

>> 10B 2011 absent in 1 of 14 series, but is not usually narrow: master index is .452

>> 466B 1980 absent in 1 of 14 series, but is not usually narrow: master index is .332

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

\*C\* Number of dated series 14 \*C\*

\*O\* Master series 1891 2012 122 yrs \*O\*

\*F\* Total rings in all series 1399 \*F\*

\*E\* Total dated rings checked 1390 \*E\*

\*C\* Series intercorrelation .482 \*C\*

\*H\* Average mean sensitivity .314 \*H\*

\*A\* Segments, possible problems 8 \*A\*

\*\*\* Mean length of series 99.9 \*\*\*

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

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

10B 5 absent rings: 1988 1989 2001 2006 2011

466B 3 absent rings: 1968 1980 1989

485B 3 absent rings: 2006 2007 2010

11 absent rings .786%

PART 2: TIME PLOT OF TREE-RING SERIES: Run6 16:32 Thu 06 Mar 2014 Page 2

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

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

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

. . . . . . . . . . . . . . . . . <==========> . 10A 1 1902 2012 111

. . . . . . . . . . . . . . . . . <==========> . 10B 2 1904 2012 109

. . . . . . . . . . . . . . . . . .<=========> . 12A 3 1915 2012 98

. . . . . . . . . . . . . . . . . .<=========> . 12B 4 1916 2012 97

. . . . . . . . . . . . . . . . . <==========> . 13B 5 1900 2012 113

. . . . . . . . . . . . . . . . . . <======> . 465B 6 1948 2012 65

. . . . . . . . . . . . . . . . . <===========> . 466B 7 1891 2012 122

. . . . . . . . . . . . . . . . . . <========> . 470A 8 1927 2012 86

. . . . . . . . . . . . . . . . . . <========> . 470B 9 1926 2012 87

. . . . . . . . . . . . . . . . . <==========> . 473A 10 1909 2012 104

. . . . . . . . . . . . . . . . . .<=========> . 473B 11 1911 2012 102

. . . . . . . . . . . . . . . . . <==========> . 474A 12 1909 2012 104

. . . . . . . . . . . . . . . . . . <========> . 484B 13 1920 2012 93

. . . . . . . . . . . . . . . . . <==========> . 485B 14 1905 2012 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: Run6 16:32 Thu 06 Mar 2014 Page 3

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

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

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

1900 -3.179 2 1950 .458 14 2000 -.646 14

1901 -1.166 2 1951 .880 14 2001 -1.260 14 1

1902 -.373 3 1952 .418 14 2002 -.655 14

1903 1.392 3 1953 .776 14 2003 .319 14

1904 1.207 4 1954 -2.472 14 2004 1.377 14

1905 .617 5 1955 .638 14 2005 .137 14

1906 1.157 5 1956 1.099 14 2006 -1.665 14 2

1907 -.697 5 1957 .026 14 2007 -.980 14 1

1908 .124 5 1958 .892 14 2008 .296 14

1909 .451 7 1959 .270 14 2009 1.508 14

1910 .398 7 1960 .403 14 2010 -2.077 14 1

1911 1.407 8 1961 .700 14 2011 .452 14 1<<

1912 .247 8 1962 .070 14 2012 1.004 14

1913 .377 8 1963 .887 14

1914 -.684 8 1964 .162 14

1915 -.642 9 1965 .355 14

1916 .455 10 1966 -.228 14

1917 .221 10 1967 -1.058 14

1918 -2.186 10 1968 -2.313 14 1

1919 -.184 10 1969 -.556 14

1920 .775 11 1970 -.274 14

1921 .748 11 1971 .083 14

1922 1.091 11 1972 .409 14

1923 -.044 11 1973 -1.217 14

1924 .387 11 1974 -.738 14

1925 -.089 11 1975 -1.122 14

1926 .132 12 1976 -.320 14

1927 .128 13 1977 -.716 14

1928 -.081 13 1978 -.091 14

1929 -.811 13 1979 -.116 14

1930 -1.196 13 1980 .332 14 1<<

1931 -.863 13 1981 -.188 14

1932 -1.407 13 1982 -.012 14

1933 -1.312 13 1983 .387 14

1934 -.765 13 1984 1.516 14

1935 .732 13 1985 1.797 14

1936 .749 13 1986 .458 14

1937 1.448 13 1987 .126 14

1938 .895 13 1988 -2.352 14 1

1939 .506 13 1989 -2.085 14 2

1940 -.526 13 1990 -.428 14

1891 -.180 1 1941 .310 13 1991 .541 14

1892 -.789 1 1942 .407 13 1992 .654 14

1893 -1.381 1 1943 .499 13 1993 -.008 14

1894 .617 1 1944 -.701 13 1994 1.649 14

1895 -.311 1 1945 .160 13 1995 1.133 14

1896 .834 1 1946 -1.261 13 1996 1.026 14

1897 3.511 1 1947 -1.001 13 1997 .273 14

1898 -.082 1 1948 -.379 14 1998 .968 14

1899 -.568 1 1949 .045 14 1999 -.069 14

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

PART 4: Master Bar Plot: Run6 16:32 Thu 06 Mar 2014 Page 4

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

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

1900m 1950-------B 2000--c

1901-e 1951---------D 2001-e

1902---a 1952-------B 2002--c

1903----------F 1953--------C 2003------A

1904---------E 1954j 2004----------F

1905--------B 1955--------C 2005-----A

1906---------E 1956---------D 2006g

1907--c 1957----@ 2007-d

1908-----@ 1958---------D 2008------A

1909-------B 1959------A 2009----------F

1910-------B 1960-------B 2010h

1911----------F 1961--------C 2011-------B

1912------A 1962-----@ 2012---------D

1913------B 1963---------D

1914--c 1964-----A

1915--c 1965------A

1916-------B 1966---a

1917-----A 1967-d

1918i 1968i

1919----a 1969--b

1920--------C 1970---a

1921--------C 1971-----@

1922---------D 1972-------B

1923----@ 1973-e

1924------B 1974--c

1925----@ 1975-d

1926-----A 1976---a

1927-----A 1977--c

1928----@ 1978----@

1929--c 1979----@

1930-e 1980------A

1931--c 1981----a

1932-f 1982----@

1933-e 1983------B

1934--c 1984----------F

1935--------C 1985----------G

1936--------C 1986-------B

1937----------F 1987-----A

1938---------D 1988i

1939-------B 1989h

1940--b 1990---b

1891----a 1941------A 1991-------B

1892--c 1942-------B 1992--------C

1893-f 1943-------B 1993----@

1894--------B 1944--c 1994----------G

1895---a 1945-----A 1995---------E

1896---------C 1946-e 1996---------D

1897----------N 1947-d 1997------A

1898----@ 1948---b 1998---------D

1899--b 1949-----@ 1999----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: Run6 16:32 Thu 06 Mar 2014 Page 5

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

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 1900 1925 1950 1975

1949 1974 1999 2024

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

1 10A 1902 2012 .44 .43 .51 .57

2 10B 1904 2012 .73 .59 .45 .42

3 12A 1915 2012 .42 .36 .62 .51

4 12B 1916 2012 .44 .52 .53 .47

5 13B 1900 2012 .41 .39 .34 .39

6 465B 1948 2012 .51 .51 .41

7 466B 1891 2012 .42 .18B .10B .38

8 470A 1927 2012 .33 .29A .44

9 470B 1926 2012 .50 .44 .55

10 473A 1909 2012 .31B .57 .67 .75

11 473B 1911 2012 .67 .59 .62 .73

12 474A 1909 2012 .34 .24B .41 .59

13 484B 1920 2012 .18B .19B .38 .44

14 485B 1905 2012 .36B .44 .68 .57

Av segment correlation .43 .42 .47 .51

PART 6: POTENTIAL PROBLEMS: Run6 16:32 Thu 06 Mar 2014 Page 5

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

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

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

10A 1902 to 2012 111 years Series 1

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

Lower 1902< -.030 1954> -.017 2011< -.014 1914> -.012 1908< -.010 1994< -.009 Higher 1988 .026 1967 .011

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

1918 -7.4 SD

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

10B 1904 to 2012 109 years Series 2

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

Lower 2010> -.022 2011< -.021 1994< -.019 1980< -.017 1973> -.017 1954> -.011 Higher 1988 .034 1918 .022

[D] 5 Absent rings: Year Master N series Absent

1988 -2.352 14 1

1989 -2.085 14 2

2001 -1.260 14 1

2006 -1.665 14 2

2011 .452 14 1 >> WARNING: Ring is not usually narrow

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

12A 1915 to 2012 98 years Series 3

[B] Entire series, effect on correlation ( .467) is:

Lower 2010> -.031 2005< -.025 1967> -.018 1937< -.017 1944> -.015 1968> -.012 Higher 1954 .065 1988 .036

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

12B 1916 to 2012 97 years Series 4

[B] Entire series, effect on correlation ( .446) is:

Lower 1918> -.033 1950< -.021 1966> -.020 1952< -.016 2005> -.015 1944> -.012 Higher 1954 .076 2006 .027

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

1918 +3.3 SD; 1954 -4.7 SD

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

13B 1900 to 2012 113 years Series 5

[B] Entire series, effect on correlation ( .401) is:

Lower 1988> -.027 1915> -.019 1902> -.019 1986< -.018 1917< -.017 1921< -.015 Higher 1918 .037 1954 .036

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

1915 +3.5 SD

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

465B 1948 to 2012 65 years Series 6

[B] Entire series, effect on correlation ( .524) is:

Lower 1966< -.044 1991< -.026 1968> -.016 1977< -.014 1970< -.013 1973> -.012 Higher 1954 .087 1994 .017

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

466B 1891 to 2012 122 years Series 7

[\*] Early part of series cannot be checked from 1891 to 1899 -- 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

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

1925 1974 -5 .16 -.32 -.27 -.04 .10 .33\* .20 .11 -.09 -.16 .18|-.07 .20 .14 .02 -.35 -.31 -.22 -.07 .06 .11

1950 1999 -5 .24 -.04 -.09 -.08 .04 .28\* .05 .10 -.12 -.08 .10|-.05 .03 .06 -.03 -.01 -.15 -.01 -.07 .19 .01

[B] Entire series, effect on correlation ( .386) is:

Lower 1951< -.021 1980< -.020 1954> -.015 1912> -.015 1936< -.013 1975> -.010 Higher 1968 .045 1900 .037

1925 to 1974 segment:

Lower 1954> -.053 1951< -.051 1936< -.031 1967> -.022 1950< -.019 1964< -.014 Higher 1968 .180 1956 .021

1950 to 1999 segment:

Lower 1951< -.036 1954> -.032 1980< -.028 1988> -.020 1975> -.020 1999> -.018 Higher 1968 .168 1989 .031

[D] 3 Absent rings: Year Master N series Absent

1968 -2.313 14 1

1980 .332 14 1 >> WARNING: Ring is not usually narrow

1989 -2.085 14 2

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

1968 -5.8 SD

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

470A 1927 to 2012 86 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

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

1950 1999 0 .08 -.09 .19 .03 -.34 -.19 -.26 .02 .04 -.01 .29\*-.06 .02 .02 .09 .27 .23 .15 -.07 -.01 -.11

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

Lower 1967> -.026 1984< -.024 1933> -.022 1954> -.015 1977> -.015 2004< -.014 Higher 2010 .118 1968 .026

1950 to 1999 segment:

Lower 1984< -.047 1967> -.046 1977> -.028 1964< -.026 1985< -.014 1962< -.014 Higher 1968 .078 1994 .056

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

470B 1926 to 2012 87 years Series 9

[B] Entire series, effect on correlation ( .529) is:

Lower 1988> -.034 1968> -.022 1954> -.018 1933> -.012 1958< -.012 1993< -.009 Higher 2010 .028 1994 .012

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

473A 1909 to 2012 104 years Series 10

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

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

1909 1958 2 .07 -.11 .08 -.17 -.19 .01 -.38 -.07 -.18 -.19 .31| .07 .33\* .05 .00 .24 .13 -.19 .24 -.22 .00

[B] Entire series, effect on correlation ( .568) is:

Lower 1918> -.070 1913< -.018 1977> -.016 1954> -.016 1910< -.010 1914> -.009 Higher 2010 .050 1988 .040

1909 to 1958 segment:

Lower 1918> -.149 1913< -.043 1910< -.024 1914> -.016 1926< -.013 1947> -.012 Higher 1911 .038 1946 .030

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

1918 +3.6 SD

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

473B 1911 to 2012 102 years Series 11

[B] Entire series, effect on correlation ( .686) is:

Lower 1967> -.015 1918> -.012 1979< -.012 1977> -.011 1997< -.011 1983< -.008 Higher 2010 .044 1988 .030

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

474A 1909 to 2012 104 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

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

1925 1974 1 -.07 -.14 .22 .10 -.10 .22 -.26 -.05 .06 .03 .24| .27\* .09 .14 -.14 -.02 .22 -.05 -.01 -.21 -.33

[B] Entire series, effect on correlation ( .497) is:

Lower 1968> -.050 1934> -.017 1951< -.016 1948< -.016 1954> -.015 1972< -.012 Higher 2010 .079 1988 .030

1925 to 1974 segment:

Lower 1968> -.117 1951< -.040 1934> -.038 1948< -.037 1972< -.029 1969< -.012 Higher 1973 .066 1967 .046

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

1968 +3.0 SD; 2010 -5.4 SD

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

484B 1920 to 2012 93 years Series 13

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

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

1920 1969 -1 -.15 .17 .08 -.05 .06 -.24 -.03 -.11 -.05 .39\* .18|-.12 -.12 .04 -.14 .24 .16 .11 .17 -.25 .03

1925 1974 -1 -.18 .11 .15 -.06 .06 -.21 -.02 -.10 .06 .38\* .19|-.12 -.16 .10 -.18 .24 .11 .11 .15 -.25 .03

[B] Entire series, effect on correlation ( .316) is:

Lower 1932> -.026 1963< -.022 1924< -.019 1955< -.017 1965< -.016 1941< -.015 Higher 1968 .050 1954 .044

1920 to 1969 segment:

Lower 1932> -.044 1963< -.036 1924< -.029 1955< -.028 1929> -.024 1941< -.023 Higher 1968 .136 1954 .103

1925 to 1974 segment:

Lower 1932> -.044 1963< -.039 1955< -.029 1965< -.026 1941< -.025 1929> -.023 Higher 1968 .129 1954 .099

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

1932 +3.8 SD

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

485B 1905 to 2012 108 years Series 14

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

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

1905 1954 -2 -.04 .18 -.06 .05 -.19 -.28 -.05 -.09 .47\* .01 .36|-.08 -.25 -.02 -.04 .02 -.15 -.23 -.05 .04 -.17

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

Lower 1909< -.027 1968> -.024 1923> -.020 1935< -.019 1974< -.012 1916< -.011 Higher 1954 .063 1988 .044

1905 to 1954 segment:

Lower 1909< -.052 1923> -.044 1935< -.037 1944> -.022 1916< -.020 1930> -.019 Higher 1954 .197 1946 .029

[D] 3 Absent rings: Year Master N series Absent

2006 -1.665 14 2

2007 -.980 14 1

2010 -2.077 14 1

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

PART 7: DESCRIPTIVE STATISTICS: Run6 16:32 Thu 06 Mar 2014 Page 6

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

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 10A 1902 2012 111 4 0 .457 1.01 2.93 .679 .864 .302 2.50 .300 -.017 1

2 10B 1904 2012 109 4 0 .584 .99 3.63 .797 .904 .410 2.72 .551 .075 1

3 12A 1915 2012 98 4 0 .467 1.23 3.38 .687 .705 .307 2.74 .486 .034 1

4 12B 1916 2012 97 4 0 .446 1.04 3.23 .566 .750 .277 2.58 .402 -.029 1

5 13B 1900 2012 113 4 0 .401 1.11 2.88 .577 .748 .263 2.74 .482 .087 1

6 465B 1948 2012 65 3 0 .524 .86 2.06 .453 .706 .301 2.65 .441 -.079 1

7 466B 1891 2012 122 4 2 .386 .68 2.71 .512 .832 .404 2.60 .322 -.040 1

8 470A 1927 2012 86 3 1 .421 1.02 3.50 .875 .894 .333 2.56 .349 -.133 1

9 470B 1926 2012 87 3 0 .529 1.28 2.35 .450 .569 .245 2.62 .568 -.019 1

10 473A 1909 2012 104 4 1 .568 1.37 3.24 .619 .661 .284 2.63 .396 .032 1

11 473B 1911 2012 102 4 0 .686 1.31 2.60 .528 .730 .247 2.48 .478 -.028 1

12 474A 1909 2012 104 4 1 .497 1.28 4.30 .763 .770 .283 2.60 .325 -.014 1

13 484B 1920 2012 93 4 2 .316 1.02 3.16 .806 .910 .306 2.60 .462 .005 1

14 485B 1905 2012 108 4 1 .473 1.22 3.95 .903 .865 .400 2.67 .456 .044 1

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

Total or mean: 1399 53 8 .482 1.10 4.30 .662 .783 .314 2.74 .427 -.002

- = [ COFECHA

BLT COF ] = -