[] Dendrochronology Program Library Run BLT Program COF 15:28 Thu 05 Sep 2013 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 28739

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Run3

File of DATED series: BLTHigh\_ABBA\_3\_

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 1924 to 2012 89 years

Continuous time span is 1924 to 2012 89 years

Portion with two or more series is 1928 to 2012 85 years

>> 500A 1961 absent in 1 of 17 series, but is not usually narrow: master index is .681

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

\*C\* Number of dated series 18 \*C\*

\*O\* Master series 1924 2012 89 yrs \*O\*

\*F\* Total rings in all series 1316 \*F\*

\*E\* Total dated rings checked 1312 \*E\*

\*C\* Series intercorrelation .576 \*C\*

\*H\* Average mean sensitivity .194 \*H\*

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

\*\*\* Mean length of series 73.1 \*\*\*

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

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

500A 4 absent rings: 1959 1960 1961 1962

4 absent rings .304%

PART 2: TIME PLOT OF TREE-RING SERIES: Run3 15:28 Thu 05 Sep 2013 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

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

. . . . . . . . . . . . . . . . . . <========> . 488A 1 1929 2012 84

. . . . . . . . . . . . . . . . . . <======> . 490A 2 1947 2012 66

. . . . . . . . . . . . . . . . . . <======> . 490B 3 1943 2012 70

. . . . . . . . . . . . . . . . . . <=======> . 491A 4 1937 2012 76

. . . . . . . . . . . . . . . . . . <=======> . 491B 5 1934 2012 79

. . . . . . . . . . . . . . . . . . <========> . 492A 6 1929 2012 84

. . . . . . . . . . . . . . . . . . <========> . 492B 7 1928 2012 85

. . . . . . . . . . . . . . . . . . . <===> . 493A 8 1970 2012 43

. . . . . . . . . . . . . . . . . . <======> . 495B 9 1947 2012 66

. . . . . . . . . . . . . . . . . . <======> . 496A 10 1941 2012 72

. . . . . . . . . . . . . . . . . . <======> . 496B 11 1948 2012 65

. . . . . . . . . . . . . . . . . . <=====> . 497B 12 1954 2012 59

. . . . . . . . . . . . . . . . . . <======> . 498B 13 1942 2012 71

. . . . . . . . . . . . . . . . . . <=======> . 499A 14 1931 2012 82

. . . . . . . . . . . . . . . . . . <=======> . 499C 15 1930 2012 83

. . . . . . . . . . . . . . . . . . <========> . 500A 16 1924 2012 89

. . . . . . . . . . . . . . . . . . <=======> . 500B 17 1937 2012 76

. . . . . . . . . . . . . . . . . . <======> . 495C 18 1947 2012 66

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

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: Run3 15:28 Thu 05 Sep 2013 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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1950 .023 16 2000 1.009 18

1951 .816 16 2001 1.858 18

1952 .975 16 2002 -.147 18

1953 -.381 16 2003 -.931 18

1954 .510 17 2004 .000 18

1955 .095 17 2005 -.092 18

1956 -3.910 17 2006 -.374 18

1957 -.258 17 2007 .814 18

1958 .115 17 2008 .270 18

1959 -.516 17 1 2009 .947 18

1960 -1.688 17 1 2010 .353 18

1961 .681 17 1<< 2011 -1.216 18

1962 -1.037 17 1 2012 -.340 18

1963 -.991 17

1964 .672 17

1965 -.001 17

1966 -.352 17

1967 -1.150 17

1968 -.557 17

1969 .786 17

1970 .957 18

1971 1.114 18

1972 1.023 18

1973 1.062 18

1924 1.294 1 1974 .076 18

1925 .820 1 1975 -.220 18

1926 -.189 1 1976 .518 18

1927 -1.254 1 1977 -.995 18

1928 -1.182 2 1978 -.371 18

1929 -3.246 4 1979 -.277 18

1930 .022 5 1980 1.025 18

1931 .836 6 1981 -1.723 18

1932 1.546 6 1982 -1.486 18

1933 .891 6 1983 .701 18

1934 -.189 7 1984 -.922 18

1935 -.371 7 1985 .508 18

1936 -.712 7 1986 .646 18

1937 -.499 9 1987 1.199 18

1938 1.051 9 1988 .298 18

1939 1.531 9 1989 -.684 18

1940 -1.399 9 1990 .943 18

1941 .127 10 1991 .147 18

1942 -.552 11 1992 .458 18

1943 .069 12 1993 .783 18

1944 .420 12 1994 -.117 18

1945 1.157 12 1995 -.551 18

1946 1.110 12 1996 -1.632 18

1947 -.368 15 1997 -.255 18

1948 -.357 16 1998 -.683 18

1949 1.869 16 1999 .047 18

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PART 4: Master Bar Plot: Run3 15:28 Thu 05 Sep 2013 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

1950-----@ 2000---------D

1951--------C 2001----------G

1952---------D 2002----a

1953---b 2003-d

1954-------B 2004-----@

1955-----@ 2005----@

1956p 2006---a

1957----a 2007--------C

1958-----@ 2008------A

1959--b 2009---------D

1960g 2010------A

1961-------C 2011-e

1962-d 2012---a

1963-d

1964-------C

1965-----@

1966---a

1967-e

1968--b

1969--------C

1970---------D

1971---------D

1972---------D

1973---------D

1924----------E 1974-----@

1925--------C 1975----a

1926----a 1976-------B

1927-e 1977-d

1928-e 1978---a

1929m 1979----a

1930-----@ 1980---------D

1931--------C 1981g

1932----------F 1982f

1933--------D 1983-------C

1934----a 1984-d

1935---a 1985-------B

1936--c 1986-------C

1937--b 1987---------E

1938---------D 1988------A

1939----------F 1989--c

1940f 1990---------D

1941-----A 1991-----A

1942--b 1992------B

1943-----@ 1993--------C

1944------B 1994----@

1945---------E 1995--b

1946---------D 1996g

1947---a 1997----a

1948---a 1998--c

1949----------G 1999-----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: Run3 15:28 Thu 05 Sep 2013 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 1925 1950 1975

1974 1999 2024

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

1 488A 1929 2012 .77 .77 .51

2 490A 1947 2012 .52 .58 .49

3 490B 1943 2012 .64 .63 .33B

4 491A 1937 2012 .77 .74 .49

5 491B 1934 2012 .67 .56B .47

6 492A 1929 2012 .64 .62 .66

7 492B 1928 2012 .63 .70 .57

8 493A 1970 2012 .51

9 495B 1947 2012 .52 .50 .55

10 496A 1941 2012 .57 .57 .50

11 496B 1948 2012 .46 .46 .43

12 497B 1954 2012 .58 .33

13 498B 1942 2012 .58 .55 .44

14 499A 1931 2012 .70 .68 .62

15 499C 1930 2012 .75 .73 .60

16 500A 1924 2012 .53 .50 .34

17 500B 1937 2012 .71 .68 .43

18 495C 1947 2012 .46 .44 .45

Av segment correlation .62 .60 .48

PART 6: POTENTIAL PROBLEMS: Run3 15:28 Thu 05 Sep 2013 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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488A 1929 to 2012 84 years Series 1

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

Lower 1940> -.024 2000< -.014 1999< -.013 1952< -.009 1955> -.007 1997< -.006 Higher 1956 .120 1929 .034

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

490A 1947 to 2012 66 years Series 2

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

Lower 1948< -.051 1975< -.019 1982> -.016 1973< -.013 1967> -.011 1965> -.010 Higher 1956 .057 2001 .013

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

490B 1943 to 2012 70 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

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

1963 2012 -7 .15 -.18 .07 .43\*-.10 -.15 -.10 -.11 -.35 .00 .33| - - - - - - - - - -

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

Lower 1985< -.035 1981> -.029 2002> -.020 1943< -.015 2012< -.013 1988< -.013 Higher 1956 .161 2001 .012

1963 to 2012 segment:

Lower 1985< -.057 1981> -.038 2002> -.032 1984> -.017 2012< -.017 2009< -.015 Higher 2001 .034 1989 .025

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

491A 1937 to 2012 76 years Series 4

[B] Entire series, effect on correlation ( .693) is:

Lower 1981> -.056 2002> -.021 1992< -.015 2001< -.011 1943< -.010 2006> -.008 Higher 1956 .098 1949 .012

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

1981 +3.1 SD

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

491B 1934 to 2012 79 years Series 5

[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 7 .03 -.07 .06 .04 -.05 -.09 -.07 .02 -.29 -.13 .56|-.19 -.03 .34 -.08 -.21 .13 .60\*-.16 .07 .04

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

Lower 1989< -.022 1981> -.022 1984> -.018 1962> -.018 1934> -.015 1953< -.010 Higher 1956 .069 1940 .026

1950 to 1999 segment:

Lower 1989< -.038 1981> -.028 1984> -.025 1962> -.025 1953< -.018 1982> -.011 Higher 1956 .133 1977 .012

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

492A 1929 to 2012 84 years Series 6

[B] Entire series, effect on correlation ( .605) is:

Lower 1982< -.064 1929> -.043 1998< -.012 1933< -.008 1942> -.007 1944< -.005 Higher 1981 .027 1956 .018

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

1929 +3.0 SD; 1982 -5.8 SD

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492B 1928 to 2012 85 years Series 7

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

Lower 1929> -.047 1964< -.022 1998< -.021 2002> -.020 1982< -.018 1931< -.016 Higher 1956 .100 1981 .027

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

493A 1970 to 2012 43 years Series 8

[B] Entire series, effect on correlation ( .515) is:

Lower 1970< -.070 1989> -.065 1977> -.040 1979< -.021 1996> -.018 2011> -.010 Higher 1981 .138 2002 .016

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

495B 1947 to 2012 66 years Series 9

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

Lower 1969< -.068 1956> -.036 1953> -.021 2003> -.012 1991> -.009 1975> -.007 Higher 1996 .022 1949 .016

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

496A 1941 to 2012 72 years Series 10

[B] Entire series, effect on correlation ( .517) is:

Lower 1941< -.047 1999< -.025 2003> -.017 1982> -.010 2012< -.009 1978< -.009 Higher 1956 .036 1981 .018

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

496B 1948 to 2012 65 years Series 11

[B] Entire series, effect on correlation ( .426) is:

Lower 2002< -.052 2008< -.022 1955< -.021 1948> -.018 1982> -.015 1996> -.014 Higher 2011 .022 2001 .021

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497B 1954 to 2012 59 years Series 12

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

Lower 2011> -.029 1981> -.028 1960> -.025 1986< -.024 1987< -.023 1976< -.020 Higher 1956 .280 1996 .023

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498B 1942 to 2012 71 years Series 13

[B] Entire series, effect on correlation ( .513) is:

Lower 1984< -.027 2002> -.023 1996> -.018 2007< -.016 2006< -.016 1982> -.011 Higher 1949 .020 1956 .015

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

499A 1931 to 2012 82 years Series 14

[B] Entire series, effect on correlation ( .687) is:

Lower 1970< -.019 1975> -.012 1948> -.010 1981< -.010 1980< -.009 1939< -.008 Higher 1956 .046 1940 .009

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

499C 1930 to 2012 83 years Series 15

[B] Entire series, effect on correlation ( .716) is:

Lower 1970< -.012 2007< -.012 1975> -.011 1995> -.010 1989> -.008 1948> -.007 Higher 1956 .081 1940 .018

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

500A 1924 to 2012 89 years Series 16

[\*] Early part of series cannot be checked from 1924 to 1927 -- not matched by another series

[B] Entire series, effect on correlation ( .439) is:

Lower 1959< -.035 1946< -.029 1980< -.022 1961< -.020 1983< -.010 1963> -.008 Higher 1929 .040 1956 .021

[D] 4 Absent rings: Year Master N series Absent

1959 -.516 17 1

1960 -1.688 17 1

1961 .681 17 1 >> WARNING: Ring is not usually narrow

1962 -1.037 17 1

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500B 1937 to 2012 76 years Series 17

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

Lower 1983< -.015 2012> -.013 1980< -.012 1957< -.010 1989> -.010 1946< -.010 Higher 1956 .160 1940 .013

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

495C 1947 to 2012 66 years Series 18

[B] Entire series, effect on correlation ( .431) is:

Lower 1955< -.039 1991< -.030 1978< -.025 2009< -.025 1962> -.018 1984> -.017 Higher 1956 .063 1996 .030

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PART 7: DESCRIPTIVE STATISTICS: Run3 15:28 Thu 05 Sep 2013 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 488A 1929 2012 84 3 0 .685 .84 2.63 .522 .914 .187 2.65 .349 -.098 1

2 490A 1947 2012 66 3 0 .527 1.18 2.09 .429 .764 .191 2.46 .462 .012 1

3 490B 1943 2012 70 3 1 .563 1.03 2.48 .468 .847 .205 2.65 .466 -.028 1

4 491A 1937 2012 76 3 0 .693 .90 2.33 .432 .886 .180 2.67 .467 -.061 1

5 491B 1934 2012 79 3 1 .603 1.05 2.30 .436 .848 .158 2.74 .502 .009 1

6 492A 1929 2012 84 3 0 .605 1.11 4.56 .775 .899 .212 2.72 .413 .124 1

7 492B 1928 2012 85 3 0 .596 1.15 2.88 .678 .900 .193 2.73 .479 .008 1

8 493A 1970 2012 43 1 0 .515 2.70 3.89 .569 .684 .136 2.67 .501 .003 1

9 495B 1947 2012 66 3 0 .529 1.18 1.84 .255 .540 .148 2.63 .487 -.017 1

10 496A 1941 2012 72 3 0 .517 1.03 2.70 .574 .858 .242 2.77 .595 .002 1

11 496B 1948 2012 65 3 0 .426 .94 2.47 .479 .826 .225 2.51 .396 -.083 1

12 497B 1954 2012 59 2 0 .531 1.73 4.01 1.072 .909 .182 2.45 .384 -.044 1

13 498B 1942 2012 71 3 0 .513 1.03 1.87 .352 .829 .154 2.57 .435 -.039 1

14 499A 1931 2012 82 3 0 .687 1.14 2.50 .499 .884 .198 2.54 .366 .017 1

15 499C 1930 2012 83 3 0 .716 1.13 2.45 .513 .885 .192 2.64 .411 .005 1

16 500A 1924 2012 89 3 0 .439 1.13 3.28 .750 .871 .248 2.58 .408 .004 1

17 500B 1937 2012 76 3 0 .666 1.05 2.44 .627 .898 .239 2.50 .338 .012 1

18 495C 1947 2012 66 3 0 .431 1.20 1.94 .334 .724 .166 2.53 .536 .070 1

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

Total or mean: 1316 51 2 .576 1.15 4.56 .545 .840 .194 2.77 .441 -.005

- = [ COFECHA BLT COF ] = -