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[] P R O G R A M C O F E C H A Version 6.06P 28738

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Run2

File of DATED series: USPHigh\_ABBA\_2

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 1910 to 2012 103 years

Continuous time span is 1910 to 2012 103 years

Portion with two or more series is 1919 to 2012 94 years

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

\*C\* Number of dated series 21 \*C\*

\*O\* Master series 1910 2012 103 yrs \*O\*

\*F\* Total rings in all series 1421 \*F\*

\*E\* Total dated rings checked 1412 \*E\*

\*C\* Series intercorrelation .603 \*C\*

\*H\* Average mean sensitivity .222 \*H\*

\*A\* Segments, possible problems 0 \*A\*

\*\*\* Mean length of series 67.7 \*\*\*

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

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: Run2 15:17 Wed 04 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

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

. . . . . . . . . . . . . . . . . . .<====> . 688A 1 1961 2012 52

. . . . . . . . . . . . . . . . . . <======> . 689A 2 1946 2012 67

. . . . . . . . . . . . . . . . . . <======> . 689B 3 1949 2012 64

. . . . . . . . . . . . . . . . . . .<====> . 690A 4 1961 2012 52

. . . . . . . . . . . . . . . . . . <======> . 690B 5 1948 2012 65

. . . . . . . . . . . . . . . . . . <=======> . 691A 6 1938 2012 75

. . . . . . . . . . . . . . . . . . <=======> . 691B 7 1938 2012 75

. . . . . . . . . . . . . . . . . . <=======> . 692A 8 1930 2012 83

. . . . . . . . . . . . . . . . . . <========> . 692B 9 1928 2012 85

. . . . . . . . . . . . . . . . . . .<====> . 693A 10 1966 2012 47

. . . . . . . . . . . . . . . . . . .<====> . 693B 11 1961 2012 52

. . . . . . . . . . . . . . . . . .<=========> . 694A 12 1910 2012 103

. . . . . . . . . . . . . . . . . . <========> . 694B 13 1923 2012 90

. . . . . . . . . . . . . . . . . . .<====> . 695A 14 1965 2012 48

. . . . . . . . . . . . . . . . . . <=====> . 695B 15 1959 2012 54

. . . . . . . . . . . . . . . . . . <========> . 696A 16 1922 2012 91

. . . . . . . . . . . . . . . . . .<=========> . 696B 17 1919 2012 94

. . . . . . . . . . . . . . . . . . . <===> . 697A 18 1978 2012 35

. . . . . . . . . . . . . . . . . . .<====> . 697B 19 1968 2012 45

. . . . . . . . . . . . . . . . . . <=======> . 698A 20 1938 2012 75

. . . . . . . . . . . . . . . . . . <======> . 698B 21 1944 2012 69

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

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: Run2 15:17 Wed 04 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 -.668 13 2000 -.318 21

1951 .778 13 2001 1.675 21

1952 .726 13 2002 -1.395 21

1953 .991 13 2003 -.643 21

1954 .918 13 2004 -1.184 21

1955 1.591 13 2005 -.570 21

1956 -1.628 13 2006 -1.552 21

1957 1.032 13 2007 .576 21

1958 1.070 13 2008 -.092 21

1959 .033 14 2009 .798 21

1910 1.068 1 1960 -1.587 14 2010 1.191 21

1911 -1.430 1 1961 .575 17 2011 -.793 21

1912 -1.423 1 1962 -1.363 17 2012 .251 21

1913 .055 1 1963 -1.611 17

1914 -1.493 1 1964 .919 17

1915 -.184 1 1965 1.201 18

1916 1.419 1 1966 .575 19

1917 1.135 1 1967 .430 19

1918 3.101 1 1968 .312 20

1919 .984 2 1969 -.817 20

1920 .140 2 1970 -.656 20

1921 .490 2 1971 -.245 20

1922 -.760 3 1972 -.894 20

1923 .853 4 1973 -.544 20

1924 1.683 4 1974 -1.335 20

1925 -.178 4 1975 -.542 20

1926 .863 4 1976 -.052 20

1927 .315 4 1977 -.479 20

1928 .316 5 1978 -1.266 21

1929 -1.323 5 1979 -.753 21

1930 -.582 6 1980 1.842 21

1931 -1.047 6 1981 -2.156 21

1932 .704 6 1982 -1.405 21

1933 .067 6 1983 .350 21

1934 -.110 6 1984 .077 21

1935 -2.069 6 1985 1.129 21

1936 -.289 6 1986 .832 21

1937 -.779 6 1987 1.371 21

1938 .075 9 1988 .713 21

1939 -.362 9 1989 .404 21

1940 -1.375 9 1990 .922 21

1941 .106 9 1991 -.025 21

1942 -.947 9 1992 -.178 21

1943 .625 9 1993 .677 21

1944 1.446 10 1994 .395 21

1945 .665 10 1995 1.519 21

1946 -.879 11 1996 -1.050 21

1947 -.251 11 1997 .168 21

1948 -.416 12 1998 -.873 21

1949 .382 13 1999 .040 21

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PART 4: Master Bar Plot: Run2 15:17 Wed 04 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---c 2000----a

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

1952--------C 2002-f

1953---------D 2003---c

1954--------D 2004-e

1955----------F 2005---b

1956g 2006f

1957---------D 2007-------B

1958---------D 2008----@

1959-----@ 2009--------C

1910---------D 1960f 2010---------E

1911-f 1961-------B 2011--c

1912-f 1962-e 2012------A

1913-----@ 1963f

1914f 1964--------D

1915----a 1965---------E

1916----------F 1966-------B

1917---------E 1967------B

1918----------L 1968------A

1919---------D 1969--c

1920-----A 1970---c

1921-------B 1971----a

1922--c 1972--d

1923--------C 1973---b

1924----------G 1974-e

1925----a 1975---b

1926--------C 1976-----@

1927------A 1977---b

1928------A 1978-e

1929-e 1979--c

1930---b 1980----------G

1931--d 1981i

1932-------C 1982-f

1933-----@ 1983------A

1934----@ 1984-----@

1935h 1985---------E

1936----a 1986--------C

1937--c 1987----------E

1938-----@ 1988-------C

1939----a 1989------B

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

1941-----@ 1991-----@

1942--d 1992----a

1943-------B 1993-------C

1944----------F 1994------B

1945-------C 1995----------F

1946--d 1996--d

1947----a 1997-----A

1948---b 1998--c

1949------B 1999-----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: Run2 15:17 Wed 04 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 1900 1925 1950 1975

1949 1974 1999 2024

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

1 688A 1961 2012 .61 .62

2 689A 1946 2012 .72 .77 .70

3 689B 1949 2012 .50 .50 .61

4 690A 1961 2012 .64 .62

5 690B 1948 2012 .67 .65 .66

6 691A 1938 2012 .69 .75 .71

7 691B 1938 2012 .63 .69 .69

8 692A 1930 2012 .38 .71 .70

9 692B 1928 2012 .46 .80 .74

10 693A 1966 2012 .78

11 693B 1961 2012 .67 .72

12 694A 1910 2012 .59 .62 .45 .44

13 694B 1923 2012 .62 .59 .44 .36

14 695A 1965 2012 .46

15 695B 1959 2012 .58 .58

16 696A 1922 2012 .65 .66 .81 .75

17 696B 1919 2012 .67 .66 .70 .64

18 697A 1978 2012 .58

19 697B 1968 2012 .50

20 698A 1938 2012 .58 .76 .69

21 698B 1944 2012 .63 .66 .50

Av segment correlation .63 .60 .65 .63

PART 6: POTENTIAL PROBLEMS: Run2 15:17 Wed 04 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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688A 1961 to 2012 52 years Series 1

[B] Entire series, effect on correlation ( .598) is:

Lower 2006> -.038 1962> -.025 2011< -.014 1985< -.012 1968< -.010 1969< -.010 Higher 2002 .044 1981 .027

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

689A 1946 to 2012 67 years Series 2

[B] Entire series, effect on correlation ( .689) is:

Lower 1973< -.032 2006> -.026 1946< -.020 2002> -.017 1952< -.015 1960> -.011 Higher 1981 .061 1956 .031

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

689B 1949 to 2012 64 years Series 3

[B] Entire series, effect on correlation ( .588) is:

Lower 1988< -.037 1996> -.032 1975< -.026 1955< -.025 1950> -.014 1977> -.012 Higher 2002 .042 1981 .032

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

690A 1961 to 2012 52 years Series 4

[B] Entire series, effect on correlation ( .629) is:

Lower 1978< -.066 1989< -.023 2009< -.020 1982> -.013 1999< -.012 1997< -.011 Higher 2002 .035 1981 .030

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

690B 1948 to 2012 65 years Series 5

[B] Entire series, effect on correlation ( .635) is:

Lower 1956> -.022 1949< -.016 1996> -.016 1999< -.015 1979< -.014 2006> -.012 Higher 1981 .073 2002 .033

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

691A 1938 to 2012 75 years Series 6

[B] Entire series, effect on correlation ( .689) is:

Lower 1940> -.029 2011> -.016 1942> -.013 1973> -.011 1967< -.011 1938< -.009 Higher 1956 .015 2002 .013

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

691B 1938 to 2012 75 years Series 7

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

Lower 1939< -.034 1940> -.016 2006> -.013 1967< -.009 1993< -.008 1976< -.008 Higher 2002 .022 2001 .012

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

692A 1930 to 2012 83 years Series 8

[B] Entire series, effect on correlation ( .567) is:

Lower 1937> -.042 1931> -.038 2004> -.013 1946> -.013 2012< -.008 1977> -.008 Higher 1981 .072 2006 .013

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

1931 +3.5 SD; 1937 +4.1 SD

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692B 1928 to 2012 85 years Series 9

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

Lower 1940< -.048 1936< -.016 1947< -.015 2006< -.011 1929> -.011 1930> -.010 Higher 1981 .038 1996 .013

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

1940 -5.6 SD

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693A 1966 to 2012 47 years Series 10

[B] Entire series, effect on correlation ( .781) is:

Lower 1997< -.020 2002> -.019 2004< -.016 2005< -.011 1995< -.011 1968> -.011 Higher 1981 .088 2001 .011

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

693B 1961 to 2012 52 years Series 11

[B] Entire series, effect on correlation ( .684) is:

Lower 2006> -.031 1962> -.031 1963> -.026 1974> -.013 2002> -.013 1971< -.012 Higher 1981 .105 2001 .014

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694A 1910 to 2012 103 years Series 12

[\*] Early part of series cannot be checked from 1910 to 1918 -- not matched by another series

[B] Entire series, effect on correlation ( .489) is:

Lower 1981> -.083 1983< -.014 2011> -.014 1975< -.013 1920< -.013 1984< -.010 Higher 1956 .042 2002 .032

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

1981 +3.7 SD

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694B 1923 to 2012 90 years Series 13

[B] Entire series, effect on correlation ( .474) is:

Lower 1984< -.091 1981> -.048 2011> -.023 1978> -.013 1926< -.012 1940< -.009 Higher 2002 .030 1980 .018

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

1981 +3.1 SD; 1984 -4.9 SD

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695A 1965 to 2012 48 years Series 14

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

Lower 2002> -.082 2008< -.046 1974> -.025 2011> -.022 2007< -.019 1988< -.017 Higher 1981 .100 1980 .019

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695B 1959 to 2012 54 years Series 15

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

Lower 2002> -.081 1962> -.028 1963> -.025 2008< -.018 2010< -.016 1999< -.014 Higher 1981 .124 1980 .022

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

696A 1922 to 2012 91 years Series 16

[B] Entire series, effect on correlation ( .691) is:

Lower 1931< -.033 1969> -.017 1934< -.017 1937< -.013 1922> -.012 1996> -.011 Higher 1956 .022 1981 .015

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

696B 1919 to 2012 94 years Series 17

[B] Entire series, effect on correlation ( .653) is:

Lower 2006> -.025 1981> -.020 1920> -.014 1969> -.011 1932< -.008 1982< -.008 Higher 2002 .026 1956 .012

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

697A 1978 to 2012 35 years Series 18

[B] Entire series, effect on correlation ( .582) is:

Lower 2000< -.053 1993< -.041 1998> -.036 1979> -.022 2004> -.012 1984> -.011 Higher 1981 .204 2006 .013

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

697B 1968 to 2012 45 years Series 19

[B] Entire series, effect on correlation ( .503) is:

Lower 2002> -.063 1986< -.043 1998> -.028 1993< -.023 1996> -.020 1992< -.016 Higher 1981 .205 1980 .025

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

698A 1938 to 2012 75 years Series 20

[B] Entire series, effect on correlation ( .592) is:

Lower 1938< -.045 1940> -.038 2012< -.026 2006> -.023 1942> -.018 1944< -.013 Higher 1981 .071 2002 .029

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

1940 +3.3 SD

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

698B 1944 to 2012 69 years Series 21

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

Lower 2006> -.035 2012< -.019 2004> -.018 2010< -.015 1969> -.014 1997< -.012 Higher 2002 .025 1962 .020

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[\*] All segments correlate highest as dated with correlation with master series over .3281

PART 7: DESCRIPTIVE STATISTICS: Run2 15:17 Wed 04 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 688A 1961 2012 52 2 0 .598 1.04 2.16 .483 .764 .267 2.50 .511 -.036 1

2 689A 1946 2012 67 3 0 .689 2.04 3.72 .592 .624 .201 2.61 .566 -.018 1

3 689B 1949 2012 64 3 0 .588 1.57 2.72 .462 .646 .192 2.70 .655 -.020 1

4 690A 1961 2012 52 2 0 .629 1.35 2.56 .487 .696 .238 2.47 .464 .032 1

5 690B 1948 2012 65 3 0 .635 1.11 3.37 .608 .799 .275 2.68 .459 .049 1

6 691A 1938 2012 75 3 0 .689 1.27 2.88 .444 .675 .217 2.53 .403 -.052 1

7 691B 1938 2012 75 3 0 .660 1.28 2.16 .432 .688 .194 2.62 .434 .006 1

8 692A 1930 2012 83 3 0 .567 1.22 2.68 .629 .785 .257 2.77 .523 -.037 1

9 692B 1928 2012 85 3 0 .605 1.04 2.62 .628 .866 .289 2.50 .438 -.077 1

10 693A 1966 2012 47 1 0 .781 2.19 3.89 .989 .878 .197 2.55 .469 -.005 1

11 693B 1961 2012 52 2 0 .684 1.98 3.40 .737 .776 .209 2.54 .483 .025 1

12 694A 1910 2012 103 4 0 .489 1.45 2.66 .572 .762 .221 2.68 .541 -.011 1

13 694B 1923 2012 90 4 0 .474 1.02 2.44 .478 .810 .231 2.59 .409 -.069 1

14 695A 1965 2012 48 1 0 .457 2.71 4.09 .663 .622 .177 2.45 .441 .038 1

15 695B 1959 2012 54 2 0 .562 2.63 4.22 .717 .707 .179 2.60 .522 .057 1

16 696A 1922 2012 91 4 0 .691 1.08 2.53 .477 .782 .239 2.79 .569 -.054 1

17 696B 1919 2012 94 4 0 .653 1.17 2.21 .436 .741 .232 2.57 .515 .035 3

18 697A 1978 2012 35 1 0 .582 2.36 3.69 .485 .424 .161 2.39 .503 -.067 1

19 697B 1968 2012 45 1 0 .503 2.48 4.59 1.177 .915 .179 2.50 .476 -.080 1

20 698A 1938 2012 75 3 0 .592 1.57 3.77 .797 .841 .214 2.72 .560 .038 1

21 698B 1944 2012 69 3 0 .563 1.41 2.60 .526 .751 .210 2.65 .520 .015 1

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Total or mean: 1421 55 0 .603 1.52 4.59 .590 .749 .222 2.79 .500 -.012

- = [ COFECHA USPHICOF ] = -