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[] P R O G R A M C O F E C H A Version 6.06P 27836

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: 55\_BKE\_corr2-40

File of DATED series: 55\_BKE\_corr2

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 20 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 Y

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1913 to 2010 98 years

Continuous time span is 1913 to 2010 98 years

Portion with two or more series is 1913 to 2010 98 years

>> 208-a 2009 absent in 2 of 20 series, but is not usually narrow: master index is .729

>> 208-a 2010 absent in 2 of 20 series, but is not usually narrow: master index is 1.656

>> 208-b 2007 absent in 1 of 20 series, but is not usually narrow: master index is -.092

>> 208-b 2008 absent in 1 of 20 series, but is not usually narrow: master index is .029

>> 208-b 2009 absent in 2 of 20 series, but is not usually narrow: master index is .729

>> 208-b 2010 absent in 2 of 20 series, but is not usually narrow: master index is 1.656

>> 522-b 1971 absent in 1 of 20 series, but is not usually narrow: master index is .035

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

\*C\* Number of dated series 20 \*C\*

\*O\* Master series 1913 2010 98 yrs \*O\*

\*F\* Total rings in all series 1694 \*F\*

\*E\* Total dated rings checked 1694 \*E\*

\*C\* Series intercorrelation .498 \*C\*

\*H\* Average mean sensitivity .237 \*H\*

\*A\* Segments, possible problems 18 \*A\*

\*\*\* Mean length of series 84.7 \*\*\*

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

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

207-b 1 absent rings: 2004

208-a 2 absent rings: 2009 2010

208-b 4 absent rings: 2007 2008 2009 2010

522-b 1 absent rings: 1971

524-b 1 absent rings: 2003

9 absent rings .531%

PART 2: TIME PLOT OF TREE-RING SERIES: 55\_BKE\_corr2-40 14:29 Thu 17 Mar 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

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

. . . . . . . . . . . . . . . . . . <=======> . 201-a 1 1931 2010 80

. . . . . . . . . . . . . . . . . . <=======> . 201-b 2 1936 2010 75

. . . . . . . . . . . . . . . . . . <========> . 202-a 3 1923 2010 88

. . . . . . . . . . . . . . . . . . <========> . 202-b 4 1923 2010 88

. . . . . . . . . . . . . . . . . . <=======> . 203-a 5 1930 2010 81

. . . . . . . . . . . . . . . . . . <=======> . 203-b 6 1932 2010 79

. . . . . . . . . . . . . . . . . . <=======> . 207-a 7 1931 2010 80

. . . . . . . . . . . . . . . . . . <========> . 207-b 8 1921 2010 90

. . . . . . . . . . . . . . . . . . <=======> . 208-a 9 1933 2010 78

. . . . . . . . . . . . . . . . . . <========> . 208-b 10 1927 2010 84

. . . . . . . . . . . . . . . . . . <========> . 209-a 11 1926 2010 85

. . . . . . . . . . . . . . . . . . <========> . 209-b 12 1929 2010 82

. . . . . . . . . . . . . . . . . .<=========> . 522-a 13 1913 2010 98

. . . . . . . . . . . . . . . . . .<=========> . 522-b 14 1913 2010 98

. . . . . . . . . . . . . . . . . . <=======> . 523-a 15 1932 2010 79

. . . . . . . . . . . . . . . . . . <========> . 523-b 16 1926 2010 85

. . . . . . . . . . . . . . . . . . <=======> . 524-a 17 1931 2010 80

. . . . . . . . . . . . . . . . . . <========> . 524-b 18 1922 2010 89

. . . . . . . . . . . . . . . . . . <========> . 525-a 19 1925 2010 86

. . . . . . . . . . . . . . . . . . <========> . 525-b 20 1922 2010 89

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

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: 55\_BKE\_corr2-40 14:29 Thu 17 Mar 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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1950 .938 20 2000 .119 20

1951 .670 20 2001 .561 20

1952 .961 20 2002 .737 20

1953 1.416 20 2003 -1.166 20 1

1954 .674 20 2004 -1.012 20 1

1955 .642 20 2005 -.525 20

1956 .058 20 2006 -.429 20

1957 .242 20 2007 -.092 20 1<<

1958 .996 20 2008 .029 20 1<<

1959 .059 20 2009 .729 20 2<<

1960 -.109 20 2010 1.656 20 2<<

1961 .733 20

1962 -.848 20

1913 -4.436 2 1963 -.318 20

1914 -.088 2 1964 -.258 20

1915 .653 2 1965 -.427 20

1916 1.342 2 1966 -.825 20

1917 -.197 2 1967 -1.134 20

1918 .696 2 1968 -2.073 20

1919 -1.284 2 1969 -2.012 20

1920 .772 2 1970 -.489 20

1921 1.548 3 1971 .035 20 1<<

1922 1.781 5 1972 .305 20

1923 .716 7 1973 .779 20

1924 1.215 7 1974 .964 20

1925 -.699 8 1975 .169 20

1926 -1.214 10 1976 -.391 20

1927 -.130 11 1977 -.413 20

1928 -.928 11 1978 -.006 20

1929 -.502 12 1979 -.624 20

1930 .176 13 1980 .103 20

1931 .916 16 1981 -.371 20

1932 1.743 18 1982 -.252 20

1933 .922 19 1983 -.167 20

1934 -.722 19 1984 .625 20

1935 .241 19 1985 .765 20

1936 -.615 20 1986 1.051 20

1937 -.750 20 1987 1.511 20

1938 .627 20 1988 1.097 20

1939 .743 20 1989 1.043 20

1940 .045 20 1990 .624 20

1941 .514 20 1991 -1.582 20

1942 -.270 20 1992 .058 20

1943 -2.044 20 1993 .505 20

1944 -1.598 20 1994 -.792 20

1945 -.028 20 1995 -1.294 20

1946 -1.782 20 1996 -1.106 20

1947 .542 20 1997 -1.114 20

1948 -.955 20 1998 .428 20

1949 .851 20 1999 .746 20

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PART 4: Master Bar Plot: 55\_BKE\_corr2-40 14:29 Thu 17 Mar 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

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

1951-------C 2001-------B

1952---------D 2002--------C

1953----------F 2003-e

1954-------C 2004-d

1955-------C 2005---b

1956-----@ 2006---b

1957-----A 2007----@

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

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

1960----@ 2010----------G

1961--------C

1962--c

1913r 1963---a

1914----@ 1964---a

1915-------C 1965---b

1916----------E 1966--c

1917----a 1967-e

1918-------C 1968h

1919-e 1969h

1920--------C 1970---b

1921----------F 1971-----@

1922----------G 1972------A

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

1924---------E 1974---------D

1925--c 1975-----A

1926-e 1976---b

1927----a 1977---b

1928-d 1978-----@

1929---b 1979--b

1930-----A 1980-----@

1931---------D 1981---a

1932----------G 1982---a

1933---------D 1983----a

1934--c 1984-------C

1935-----A 1985--------C

1936--b 1986---------D

1937--c 1987----------F

1938-------C 1988---------D

1939--------C 1989---------D

1940-----@ 1990-------B

1941------B 1991f

1942---a 1992-----@

1943h 1993------B

1944f 1994--c

1945----@ 1995-e

1946g 1996-d

1947-------B 1997-d

1948-d 1998------B

1949--------C 1999--------C

PART 5: CORRELATION OF SERIES BY SEGMENTS: 55\_BKE\_corr2-40 14:29 Thu 17 Mar 2011 Page 5

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Correlations of 40-year dated segments, lagged 20 years

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

Seq Series Time\_span 1900 1920 1940 1960 1980

1939 1959 1979 1999 2019

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

1 201-a 1931 2010 .21B .33A .55 .52

2 201-b 1936 2010 .22B .25B .54 .52

3 202-a 1923 2010 .29B .39 .37 .37

4 202-b 1923 2010 .53 .51 .48 .55

5 203-a 1930 2010 .78 .62 .66 .59

6 203-b 1932 2010 .79 .75 .66 .69

7 207-a 1931 2010 .71 .63 .44 .20B

8 207-b 1921 2010 .48 .28A .34A .32A

9 208-a 1933 2010 .76 .74 .67 .51

10 208-b 1927 2010 .64 .71 .63 .59

11 209-a 1926 2010 .59 .76 .44 .38B

12 209-b 1929 2010 .71 .76 .47 .39B

13 522-a 1913 2010 .69 .54 .42B .48 .62

14 522-b 1913 2010 .69 .51 .48 .61 .50

15 523-a 1932 2010 .55 .54 .43 .25B

16 523-b 1926 2010 .41 .40 .48 .48

17 524-a 1931 2010 .55 .59 .60 .36A

18 524-b 1922 2010 .59 .54 .07B-.06B

19 525-a 1925 2010 .44 .53 .36B .44

20 525-b 1922 2010 .77 .69 .55 .32A

Av segment correlation .69 .55 .55 .49 .43

PART 6: POTENTIAL PROBLEMS: 55\_BKE\_corr2-40 14:29 Thu 17 Mar 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

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

201-a 1931 to 2010 80 years Series 1

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

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

1931 1970 6 -.08 -.01 .17 -.03 -.12 -.11 .09 .02 -.07 -.01 .21|-.32 -.10 .09 -.14 .01 .44\*-.15 -.09 .28 -.28

1940 1979 0 .00 -.13 .31 .16 -.14 .03 .16 -.25 .02 -.22 .33\*-.19 -.14 -.06 .11 -.15 .26 .05 .02 .25 -.01

[B] Entire series, effect on correlation ( .358) is:

Lower 1931< -.039 1946> -.035 1943> -.018 1950< -.018 1934> -.017 1936> -.017 Higher 1991 .062 2010 .020

1931 to 1970 segment:

Lower 1931< -.083 1946> -.060 1950< -.038 1936> -.032 1934> -.027 1943> -.018 Higher 1949 .055 1958 .029

1940 to 1979 segment:

Lower 1946> -.093 1950< -.067 1943> -.031 1971< -.024 1953< -.023 1972< -.021 Higher 1949 .067 1958 .036

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

1946 +3.1 SD; 1991 -6.7 SD

201-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1931 34 156 218 224 217 303 89 145 288

1940 267 256 216 214 198 313 301 276 222 322

1950 188 152 156 136 130 113 71 116 143 91

1960 70 97 59 58 61 64 43 49 35 29

1970 47 40 41 78 143 127 95 128 228 204

1980 219 230 197 229 237 277 303 348 216 234

1990 150 51 86 133 100 119 89 92 88 92

2000 89 83 72 35 22 18 12 25 17 35

2010 37

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

201-b 1936 to 2010 75 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

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

1936 1975 6 -.17 .23 .16 -.10 -.07 -.16 -.18 .34 -.41 .14 .22|-.17 -.05 .17 -.12 .01 .40\*-.07 .00 .26 -.33

1940 1979 8 -.15 .06 .26 -.12 -.02 .14 -.23 .20 -.51 .04 .25|-.11 -.02 .25 .09 .06 .16 -.14 .27\*-.09 -.28

[B] Entire series, effect on correlation ( .357) is:

Lower 1937< -.055 1946> -.030 1948> -.028 1951< -.021 1990< -.019 2003> -.010 Higher 1991 .066 2010 .021

1936 to 1975 segment:

Lower 1937< -.054 1946> -.046 1948> -.044 1951< -.028 1936> -.009 1953< -.006 Higher 1938 .026 1949 .020

1940 to 1979 segment:

Lower 1951< -.083 1948> -.065 1946> -.064 1953< -.010 1963< -.009 1973< -.009 Higher 1968 .034 1949 .033

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

1991 -5.9 SD

201-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1936 189 52 193 262

1940 187 205 174 159 177 233 231 210 223 231

1950 324 174 158 139 113 96 89 116 123 97

1960 67 85 48 32 30 26 26 29 17 21

1970 30 41 45 50 68 98 63 97 142 127

1980 172 179 215 206 215 246 285 295 237 190

1990 107 50 89 136 99 104 62 69 57 58

2000 50 61 49 23 10 18 16 27 19 30

2010 32

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

202-a 1923 to 2010 88 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

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

1923 1962 -8 .04 .17 .43\*-.12 -.02 .00 -.14 -.09 .02 -.05 .29| .03 -.25 .26 -.31 .03 -.19 -.11 .04 -.06 -.04

[B] Entire series, effect on correlation ( .328) is:

Lower 1951< -.053 1946> -.024 2006> -.021 1927< -.021 1926> -.017 1957< -.017 Higher 1943 .072 1948 .029

1923 to 1962 segment:

Lower 1951< -.083 1946> -.045 1926> -.032 1927< -.031 1957< -.025 1928> -.023 Higher 1943 .133 1948 .049

202-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1923 284 290 274 288 237 255 295

1930 286 324 354 254 194 184 163 188 203 227

1940 206 178 175 116 137 139 142 125 95 131

1950 132 90 83 116 102 102 92 78 88 86

1960 98 101 93 96 95 92 78 90 76 81

1970 120 130 101 114 117 89 65 71 67 53

1980 70 84 73 97 88 84 100 124 127 159

1990 117 86 107 124 96 101 84 51 49 55

2000 43 44 48 25 8 21 63 38 27 26

2010 28

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202-b 1923 to 2010 88 years Series 4

[B] Entire series, effect on correlation ( .534) is:

Lower 1946> -.033 1994> -.021 2006> -.018 1928> -.017 1952< -.017 1951< -.012 Higher 2003 .036 1943 .033

202-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1923 390 355 291 288 292 319 293

1930 348 317 355 323 269 324 231 242 264 258

1940 201 230 223 157 143 174 178 194 120 154

1950 162 116 109 127 118 142 143 118 119 109

1960 91 84 73 85 78 81 80 76 72 75

1970 135 141 132 211 175 133 69 72 60 33

1980 82 97 113 117 139 139 119 180 108 153

1990 121 94 97 104 106 85 68 54 76 72

2000 60 65 81 30 24 23 49 25 31 21

2010 25

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203-a 1930 to 2010 81 years Series 5

[B] Entire series, effect on correlation ( .678) is:

Lower 1976> -.027 1943> -.024 2010< -.020 1942< -.011 1975> -.009 1983< -.008 Higher 1991 .026 1946 .018

203-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1930 321 323 369 308 229 260 206 204 235 218

1940 209 205 131 120 111 138 89 101 68 84

1950 82 81 73 63 61 50 42 48 48 29

1960 23 33 14 17 12 14 13 12 6 10

1970 31 106 134 107 111 172 292 274 195 123

1980 123 138 153 109 169 175 183 180 171 164

1990 158 106 133 146 118 117 100 107 149 163

2000 133 115 172 70 70 74 118 185 196 193

2010 156

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203-b 1932 to 2010 79 years Series 6

[B] Entire series, effect on correlation ( .719) is:

Lower 1948> -.025 1999< -.017 1985< -.010 1981> -.009 1953< -.007 1989< -.007 Higher 1943 .026 1934 .013

203-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1932 291 290 191 213 197 160 218 230

1940 199 196 144 91 94 119 90 108 97 111

1950 98 86 80 65 64 53 44 44 47 28

1960 23 29 20 26 19 22 20 17 13 16

1970 34 61 146 237 201 164 127 169 230 221

1980 283 270 228 227 287 224 234 254 259 210

1990 186 149 182 178 133 110 133 104 155 118

2000 100 104 136 75 82 88 86 93 110 117

2010 116

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207-a 1931 to 2010 80 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

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

1971 2010 -5 -.23 .18 .11 -.16 .20 .23\*-.19 -.01 .01 -.22 .20| - - - - - - - - - -

[B] Entire series, effect on correlation ( .407) is:

Lower 2009< -.036 2008< -.034 1975< -.018 1979> -.017 1993< -.016 2006> -.013 Higher 1943 .040 1991 .016

1971 to 2010 segment:

Lower 2009< -.053 1979> -.033 2008< -.030 2006> -.025 1995> -.023 1993< -.021 Higher 1991 .044 2010 .032

207-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1931 215 214 177 155 158 132 112 103 81

1940 66 107 86 56 57 79 67 155 116 155

1950 159 163 159 158 144 133 121 149 155 157

1960 147 144 99 105 111 94 65 64 49 52

1970 176 143 123 111 118 66 67 77 119 154

1980 182 115 141 149 133 138 138 150 194 187

1990 146 116 138 108 89 108 124 108 140 112

2000 61 79 51 42 31 58 76 106 33 5

2010 37

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207-b 1921 to 2010 90 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

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

1940 1979 0 -.08 -.09 .06 .16 .26 .06 .00 .14 .03 -.02 .28\* .08 -.08 .03 -.16 -.12 .09 -.14 .20 -.23 -.28

1960 1999 0 -.07 .11 .06 .19 .30 .05 -.23 .11 .00 -.10 .34\* .15 -.15 -.13 -.11 -.28 .18 -.05 -.14 .15 .12

1971 2010 0 -.23 .13 .10 .03 .21 .01 -.24 .03 -.06 -.16 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .404) is:

Lower 1975< -.064 1947< -.019 1926> -.019 1935< -.014 1979> -.012 1921< -.010 Higher 1925 .028 1943 .019

1940 to 1979 segment:

Lower 1975< -.147 1947< -.042 1979> -.025 1942> -.016 1973< -.016 1970< -.014 Higher 1943 .053 1948 .040

1960 to 1999 segment:

Lower 1975< -.151 1979> -.030 1973< -.020 1970< -.016 1984< -.014 1985< -.011 Higher 1994 .035 1998 .026

1971 to 2010 segment:

Lower 1975< -.107 1979> -.030 2006> -.021 1973< -.016 2009< -.014 2000> -.012 Higher 2010 .041 1994 .036

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

2004 -1.012 20 1

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

1975 -5.8 SD

207-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 348 377 310 348 260 258 239 201 215

1930 199 192 168 151 103 81 84 58 62 55

1940 42 50 56 37 43 44 36 30 24 37

1950 49 60 88 93 68 97 91 104 99 81

1960 80 80 59 74 79 75 72 50 46 36

1970 35 45 86 65 64 24 51 78 72 106

1980 167 104 91 136 114 107 132 161 157 176

1990 144 112 152 144 89 93 95 78 147 145

2000 146 151 86 45 0 39 60 38 12 9

2010 30

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208-a 1933 to 2010 78 years Series 9

[B] Entire series, effect on correlation ( .590) is:

Lower 2006< -.040 2010< -.026 2009< -.026 1957< -.022 1982< -.017 1979> -.008 Higher 1948 .018 1934 .018

[D] 2 Absent rings: Year Master N series Absent

2009 .729 20 2 >> WARNING: Ring is not usually narrow

2010 1.656 20 2 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

208-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1933 168 128 174 139 120 196 145

1940 118 132 97 74 66 115 75 218 111 174

1950 174 149 153 166 122 93 74 50 71 62

1960 62 82 71 83 78 78 62 73 54 44

1970 120 154 181 219 190 166 137 134 131 147

1980 161 133 89 94 171 180 203 243 225 198

1990 135 98 110 106 97 62 73 89 153 143

2000 120 99 160 74 74 96 15 54 19 0

2010 0

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

208-b 1927 to 2010 84 years Series 10

[B] Entire series, effect on correlation ( .583) is:

Lower 1982< -.029 1957< -.020 2007< -.020 2010< -.018 1934> -.016 1955< -.012 Higher 1991 .031 1946 .025

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

2007 -.092 20 1 >> WARNING: Ring is not usually narrow

2008 .029 20 1 >> WARNING: Ring is not usually narrow

2009 .729 20 2 >> WARNING: Ring is not usually narrow

2010 1.656 20 2 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

208-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1927 216 135 153

1930 140 223 245 191 177 198 191 192 194 157

1940 142 166 143 94 101 164 92 285 154 186

1950 209 217 195 216 138 89 111 72 100 90

1960 99 125 102 123 133 107 77 74 58 54

1970 169 229 248 272 193 201 210 184 194 198

1980 216 179 115 123 211 253 206 269 254 231

1990 148 95 158 182 135 88 112 133 194 158

2000 137 160 232 98 88 104 80 0 0 0

2010 0

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

209-a 1926 to 2010 85 years Series 11

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

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

1971 2010 -3 -.02 .00 -.20 -.18 -.04 -.26 -.03 .44\*-.10 .04 .38| - - - - - - - - - -

[B] Entire series, effect on correlation ( .511) is:

Lower 2006< -.033 1937> -.030 1991> -.024 1928> -.020 1986< -.013 1934> -.012 Higher 1946 .032 1948 .018

1971 to 2010 segment:

Lower 1991> -.051 2006< -.045 1986< -.030 1990> -.021 1987< -.017 1985< -.015 Higher 1994 .055 2010 .043

209-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1926 55 108 149 131

1930 155 180 294 241 222 256 221 319 295 269

1940 261 216 190 140 115 149 97 207 136 177

1950 202 190 165 165 158 136 103 106 122 94

1960 98 114 81 83 69 76 73 60 53 49

1970 66 105 103 163 322 217 120 146 152 122

1980 106 97 143 131 125 101 85 85 78 74

1990 143 117 143 133 74 65 59 52 63 92

2000 87 97 82 56 55 73 25 41 52 66

2010 113

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

209-b 1929 to 2010 82 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

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

1971 2010 -3 -.11 .09 -.19 -.13 .09 -.27 -.21 .53\*-.04 .02 .39| - - - - - - - - - -

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

Lower 2006< -.088 1937> -.032 1991> -.026 1990> -.016 1995> -.011 1975> -.009 Higher 1946 .034 2003 .032

1971 to 2010 segment:

Lower 2006< -.098 1991> -.056 1990> -.026 1995> -.021 1975> -.017 1988< -.012 Higher 2003 .088 1994 .045

209-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1929 182

1930 183 250 323 265 184 207 196 304 271 247

1940 237 233 232 176 159 200 135 283 217 246

1950 251 288 287 258 229 249 182 211 242 169

1960 126 151 125 126 108 101 82 64 43 45

1970 107 130 153 282 255 240 122 141 172 128

1980 113 94 107 128 158 177 147 150 126 133

1990 198 159 162 157 115 130 130 104 118 126

2000 115 128 114 88 103 121 72 120 115 134

2010 132

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

522-a 1913 to 2010 98 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

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

1940 1979 -2 -.05 .00 .10 -.18 -.04 -.13 -.03 .17 .47\*-.07 .42|-.14 -.13 -.02 -.08 -.04 .15 -.18 -.03 -.10 -.16

[B] Entire series, effect on correlation ( .612) is:

Lower 1970< -.025 1919> -.018 1971< -.018 1922< -.018 1917> -.017 1968> -.013 Higher 1913 .149 1991 .011

1940 to 1979 segment:

Lower 1970< -.084 1971< -.064 1968> -.059 1945< -.025 1977< -.019 1967> -.015 Higher 1943 .060 1948 .049

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

1971 -6.6 SD

522-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1913 299 390 426 421 391 410 369

1920 423 475 392 395 404 296 284 273 225 180

1930 235 236 276 225 189 158 123 155 188 144

1940 101 102 83 38 49 42 30 58 25 70

1950 83 148 178 182 125 91 53 54 59 56

1960 67 96 70 83 77 72 72 72 77 55

1970 24 10 37 90 104 74 66 42 72 62

1980 78 93 117 107 120 132 178 177 128 117

1990 112 44 60 73 53 38 61 55 100 77

2000 65 78 49 26 37 42 19 37 42 81

2010 106

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

522-b 1913 to 2010 98 years Series 14

[B] Entire series, effect on correlation ( .595) is:

Lower 1971< -.036 1926> -.035 2002< -.026 1917< -.010 1976> -.008 1935< -.008 Higher 1913 .138 1925 .008

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

1971 .035 20 1 >> WARNING: Ring is not usually narrow

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

1971 -5.1 SD

522-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1913 287 343 349 385 313 333 271

1920 309 355 338 303 297 245 291 286 233 196

1930 212 200 207 162 123 102 96 92 81 83

1940 58 66 63 40 37 30 26 28 33 65

1950 69 48 64 70 74 65 53 52 64 63

1960 49 56 30 34 38 29 32 37 25 27

1970 20 0 12 17 48 74 94 85 93 51

1980 66 60 61 66 67 75 93 115 119 102

1990 91 66 80 85 51 34 41 41 58 44

2000 40 51 24 16 18 22 16 10 22 28

2010 22

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

523-a 1932 to 2010 79 years Series 15

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

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

1971 2010 -1 .02 -.29 -.28 -.27 -.20 .00 .03 -.16 .00 .46\* .25| - - - - - - - - - -

[B] Entire series, effect on correlation ( .450) is:

Lower 2003> -.030 1944> -.020 1937> -.018 1984< -.012 1959> -.011 1952< -.011 Higher 1946 .028 1943 .026

1971 to 2010 segment:

Lower 2003> -.051 1984< -.037 1976> -.028 1983< -.018 1994> -.014 1989< -.014 Higher 2010 .045 1995 .026

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

1946 -5.0 SD

523-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1932 348 293 258 317 230 308 269 295

1940 303 285 274 207 278 283 149 230 184 214

1950 207 232 190 250 151 171 146 141 181 194

1960 159 175 95 102 112 122 96 93 74 74

1970 154 258 202 180 174 117 118 93 65 43

1980 42 34 13 17 27 54 73 80 90 56

1990 49 27 21 25 28 21 28 43 51 68

2000 49 44 56 28 9 13 12 13 12 25

2010 34

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523-b 1926 to 2010 85 years Series 16

[B] Entire series, effect on correlation ( .438) is:

Lower 1937> -.027 1945< -.019 1938< -.019 1959< -.015 1926< -.014 1972< -.014 Higher 1943 .052 1991 .027

523-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1926 25 142 187 195

1930 240 333 377 347 257 388 344 446 361 434

1940 385 367 395 294 309 270 260 292 269 271

1950 244 287 292 290 249 200 200 181 156 92

1960 87 93 64 63 69 69 59 39 26 31

1970 27 43 26 33 35 45 46 40 38 31

1980 31 18 14 14 26 27 32 40 50 38

1990 38 16 15 13 18 8 14 20 18 37

2000 35 45 42 25 10 12 21 19 27 31

2010 49

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

524-a 1931 to 2010 80 years Series 17

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

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

1971 2010 0 .02 -.14 -.06 -.08 .00 .02 .08 -.08 .07 .12 .36\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .460) is:

Lower 2007< -.066 1948> -.034 1934> -.024 2006> -.022 1973< -.011 1937< -.011 Higher 1946 .033 1943 .023

1971 to 2010 segment:

Lower 2007< -.129 2006> -.053 2004> -.025 1973< -.021 1995> -.016 1991> -.014 Higher 2003 .058 2010 .036

524-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1931 161 158 144 150 168 148 106 165 160

1940 169 150 110 97 112 156 114 148 181 174

1950 195 155 231 236 233 207 195 204 192 156

1960 138 155 120 126 122 116 101 81 58 58

1970 88 97 91 59 49 33 32 19 29 23

1980 37 17 40 50 69 89 90 103 113 94

1990 99 73 86 84 66 70 49 47 63 91

2000 72 64 69 53 81 72 108 56 52 87

2010 120

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

524-b 1922 to 2010 89 years Series 18

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

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

1960 1999 4 -.08 -.06 .13 .02 .12 -.19 -.10 -.07 -.05 -.13 .07|-.03 .03 .18 .22\*-.12 .09 .14 .03 -.28 -.09

1971 2010 -8 .02 .00 .17\*-.04 .08 -.13 .01 -.15 -.08 -.09 -.06| - - - - - - - - - -

[B] Entire series, effect on correlation ( .378) is:

Lower 1987< -.136 1948> -.033 1994> -.018 1998< -.014 1982> -.009 1954< -.008 Higher 2003 .058 1946 .030

1960 to 1999 segment:

Lower 1987< -.264 1994> -.035 1998< -.025 1982> -.013 1995> -.010 1988< -.009 Higher 1962 .086 1986 .051

1971 to 2010 segment:

Lower 1987< -.242 1994> -.038 1998< -.023 1982> -.018 2006> -.018 1995> -.011 Higher 2003 .214 2010 .042

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

2003 -1.166 20 1

524-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 243 180 158 100 107 102 85 145

1930 133 165 189 152 131 165 169 170 198 208

1940 185 179 134 125 98 149 109 175 209 209

1950 188 193 227 208 145 168 167 165 173 150

1960 155 162 110 104 102 107 100 85 80 83

1970 117 87 101 88 86 80 57 70 57 35

1980 46 52 83 45 52 58 99 32 26 25

1990 30 26 33 33 31 26 25 15 11 15

2000 10 8 9 0 9 13 16 10 9 19

2010 27

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

525-a 1925 to 2010 86 years Series 19

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

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

1960 1999 1 -.14 .04 .01 -.27 .15 .17 -.03 .08 -.04 .04 .36| .38\* .09 .11 .01 -.20 -.10 .11 .01 -.04 -.04

[B] Entire series, effect on correlation ( .434) is:

Lower 1925> -.055 1991> -.021 1950< -.011 1926> -.011 1959> -.009 1969> -.008 Higher 1948 .026 1946 .016

1960 to 1999 segment:

Lower 1991> -.072 1969> -.031 1981> -.028 1982> -.023 1983> -.022 1961< -.018 Higher 1968 .073 1994 .037

525-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1925 229 208 199 136 147

1930 169 153 135 134 70 77 61 59 88 67

1940 43 56 45 40 39 57 39 52 27 44

1950 33 49 53 81 86 64 42 47 61 64

1960 62 46 33 33 40 24 25 24 11 27

1970 31 33 39 51 55 55 56 56 102 115

1980 146 205 289 364 336 353 348 327 279 268

1990 258 249 247 229 194 156 139 142 160 144

2000 127 114 115 90 68 57 45 41 50 62

2010 70

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

525-b 1922 to 2010 89 years Series 20

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

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

1971 2010 0 .10 .17 .00 -.28 -.25 -.15 .00 .04 .25 -.01 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .576) is:

Lower 2005< -.069 2010< -.019 1991> -.013 2004> -.012 1977< -.012 1997> -.010 Higher 1948 .020 1925 .015

1971 to 2010 segment:

Lower 2005< -.120 2010< -.038 2004> -.027 1997> -.024 1982> -.021 1991> -.014 Higher 1994 .051 2003 .037

525-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 298 268 282 199 156 210 167 178

1930 157 165 162 144 117 104 84 68 76 71

1940 71 65 50 41 46 60 38 42 24 50

1950 42 45 53 43 36 49 43 56 54 34

1960 29 43 30 34 32 21 33 23 14 10

1970 18 30 49 53 70 71 55 38 60 66

1980 84 90 140 120 166 135 118 150 121 138

1990 139 121 152 138 101 85 97 120 130 115

2000 108 116 111 84 99 63 60 59 66 65

2010 54

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PART 7: DESCRIPTIVE STATISTICS: 55\_BKE\_corr2-40 14:29 Thu 17 Mar 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 ()

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

1 201-a 1931 2010 80 4 2 .358 1.40 3.48 .905 .825 .281 2.43 .330 .076 1

2 201-b 1936 2010 75 4 2 .357 1.16 3.24 .819 .870 .277 2.58 .362 .001 1

3 202-a 1923 2010 88 4 1 .328 1.23 3.54 .762 .948 .185 2.62 .481 -.007 2

4 202-b 1923 2010 88 4 0 .534 1.44 3.90 .923 .937 .196 2.63 .465 -.005 1

5 203-a 1930 2010 81 4 0 .678 1.30 3.69 .817 .901 .225 2.54 .423 -.034 1

6 203-b 1932 2010 79 4 0 .719 1.33 2.91 .794 .913 .201 2.52 .413 -.021 1

7 207-a 1931 2010 80 4 1 .407 1.15 2.15 .452 .759 .249 2.88 .615 .057 1

8 207-b 1921 2010 90 4 3 .404 1.04 3.77 .767 .933 .279 2.62 .401 -.002 1

9 208-a 1933 2010 78 4 0 .590 1.17 2.43 .538 .721 .299 2.81 .514 -.096 1

10 208-b 1927 2010 84 4 0 .583 1.52 2.85 .649 .692 .255 2.95 .616 .026 1

11 209-a 1926 2010 85 4 1 .511 1.29 3.22 .680 .814 .227 2.90 .464 -.041 1

12 209-b 1929 2010 82 4 1 .527 1.68 3.23 .652 .783 .192 2.59 .382 -.082 1

13 522-a 1913 2010 98 5 1 .612 1.37 4.75 1.174 .960 .277 2.46 .372 -.004 2

14 522-b 1913 2010 98 5 0 .595 1.03 3.85 1.009 .976 .242 2.51 .441 -.036 1

15 523-a 1932 2010 79 4 1 .450 1.30 3.48 .974 .916 .257 2.46 .334 -.080 5

16 523-b 1926 2010 85 4 0 .438 1.31 4.46 1.339 .962 .237 2.47 .419 -.056 1

17 524-a 1931 2010 80 4 1 .460 1.08 2.36 .546 .907 .211 2.56 .492 -.013 1

18 524-b 1922 2010 89 4 2 .378 1.00 2.43 .665 .929 .247 2.81 .441 -.030 1

19 525-a 1925 2010 86 4 1 .434 1.11 3.64 .909 .966 .200 2.46 .362 -.058 1

20 525-b 1922 2010 89 4 1 .576 .90 2.98 .596 .937 .211 2.55 .484 .037 1

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

Total or mean: 1694 82 18 .498 1.24 4.75 .805 .886 .237 2.95 .441 -.018

- = [ COFECHA 55BKECOF ] = -