[] Dendrochronology Program Library Run TEST9 Program COF 13:38 Fri 09 Jun 2017 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30112

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: ACRU\_VMC495\_Corr3

File of DATED series: ACRU\_VMC495\_Corr3

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 Y

8 Parts printed 1234567

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

Time span of Master dating series is 1892 to 2015 124 years

Continuous time span is 1892 to 2015 124 years

Portion with two or more series is 1901 to 2015 115 years

>> 283B 2013 absent in 1 of 29 series, but is not usually narrow: master index is .375

>> 353A 1950 absent in 1 of 21 series, but is not usually narrow: master index is .437

>> 353A 1956 absent in 1 of 24 series, but is not usually narrow: master index is -.113

>> 368A 1987 absent in 1 of 29 series, but is not usually narrow: master index is -.273

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

\*C\* Number of dated series 31 \*C\*

\*O\* Master series 1892 2015 124 yrs \*O\*

\*F\* Total rings in all series 2324 \*F\*

\*E\* Total dated rings checked 2315 \*E\*

\*C\* Series intercorrelation .504 \*C\*

\*H\* Average mean sensitivity .251 \*H\*

\*A\* Segments, possible problems 21 \*A\*

\*\*\* Mean length of series 75.0 \*\*\*

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

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

240A 2 absent rings: 1986 2015

274A 1 absent rings: 2015

274B 1 absent rings: 2015

283B 1 absent rings: 2013

350A 1 absent rings: 2015

352A 1 absent rings: 2015

352B 1 absent rings: 2015

353A 3 absent rings: 1948 1950 1956

354B 1 absent rings: 1962

368A 1 absent rings: 1987

13 absent rings .559%

PART 2: TIME PLOT OF TREE-RING SERIES: test9 13:38 Fri 09 Jun 2017 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

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

. . . . . . . . . . . . . . . . . . <=====> . 223A 1 1952 2015 64

. . . . . . . . . . . . . . . . . . <=====> . 223B 2 1951 2015 65

. . . . . . . . . . . . . . . . . . <=====> . 229B 3 1954 2015 62

. . . . . . . . . . . . . . . . . . <=======> . 233A 4 1936 2015 80

. . . . . . . . . . . . . . . . . . <========> . 233B 5 1921 2015 95

. . . . . . . . . . . . . . . . . .<=========> . 240A 6 1916 2015 100

. . . . . . . . . . . . . . . . . .<=========> . 240B 7 1910 2015 106

. . . . . . . . . . . . . . . . . . <======> . 274A 8 1941 2015 75

. . . . . . . . . . . . . . . . . . <======> . 274B 9 1942 2015 74

. . . . . . . . . . . . . . . . . . <=====> . 278A 10 1950 2015 66

. . . . . . . . . . . . . . . . . . . <==> . 278B 11 1986 2015 30

. . . . . . . . . . . . . . . . . . <===> . . 278B2 12 1943 1984 42

. . . . . . . . . . . . . . . . . .<=========> . 283A 13 1910 2015 106

. . . . . . . . . . . . . . . . . . <========> . 283B 14 1924 2015 92

. . . . . . . . . . . . . . . . . . .<====> . 350A 15 1966 2015 50

. . . . . . . . . . . . . . . . . . .<====> . 350B 16 1966 2015 50

. . . . . . . . . . . . . . . . . <==========> . 351A 17 1903 2015 113

. . . . . . . . . . . . . . . . . . . <===> . 351B 18 1978 2015 38

. . . . . . . . . . . . . . . . . <=======> . . 351B2 19 1892 1974 83

. . . . . . . . . . . . . . . . . . <========> . 352A 20 1925 2015 91

. . . . . . . . . . . . . . . . . . <=======> . 352B 21 1932 2015 84

. . . . . . . . . . . . . . . . . .<=========> . 353A 22 1910 2015 106

. . . . . . . . . . . . . . . . . <==========> . 353B 23 1901 2015 115

. . . . . . . . . . . . . . . . . . <======> . 354A 24 1946 2015 70

. . . . . . . . . . . . . . . . . . <======> . 354B 25 1944 2015 72

. . . . . . . . . . . . . . . . . . . <==> . 361A 26 1980 2015 36

. . . . . . . . . . . . . . . . . . . <==> . 361B 27 1980 2015 36

. . . . . . . . . . . . . . . . . .<=========> . 368A 28 1915 2015 101

. . . . . . . . . . . . . . . . . .<=========> . 368B 29 1911 2015 105

. . . . . . . . . . . . . . . . . . <======> . 369A 30 1944 2015 72

. . . . . . . . . . . . . . . . . . . <===> . 369B 31 1971 2015 45

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

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: test9 13:38 Fri 09 Jun 2017 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

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

1900 -1.243 1 1950 .437 21 1<< 2000 .734 29

1901 -.323 2 1951 .924 22 2001 -1.424 29

1902 -2.194 2 1952 .531 23 2002 1.016 29

1903 -1.789 3 1953 .731 23 2003 -.336 29

1904 -1.902 3 1954 -.517 24 2004 -.539 29

1905 -3.366 3 1955 .358 24 2005 -.220 29

1906 -.499 3 1956 -.113 24 1<< 2006 .514 29

1907 1.776 3 1957 .645 24 2007 .293 29

1908 2.154 3 1958 .286 24 2008 .597 29

1909 1.831 3 1959 -.804 24 2009 -.526 29

1910 -.061 6 1960 .655 24 2010 -.840 29

1911 1.474 7 1961 .779 24 2011 .389 29

1912 .228 7 1962 -.646 24 1 2012 1.709 29

1913 -.544 7 1963 .366 24 2013 .375 29 1<<

1914 .293 7 1964 .531 24 2014 1.004 29

1915 .335 8 1965 .010 24 2015 -3.032 29 6

1916 -.218 9 1966 -.593 26

1917 -.852 9 1967 -.016 26

1918 -1.005 9 1968 -1.090 26

1919 .035 9 1969 .179 26

1920 .224 9 1970 .075 26

1921 .041 10 1971 1.012 27

1922 -1.226 10 1972 .177 27

1923 -.473 10 1973 -.739 27

1924 1.316 11 1974 -.596 27

1925 -.300 12 1975 -.607 26

1926 .508 12 1976 -.454 26

1927 -.056 12 1977 -.767 26

1928 -1.453 12 1978 1.038 27

1929 -.078 12 1979 .527 27

1930 .871 12 1980 .549 29

1931 1.385 12 1981 .340 29

1932 .642 13 1982 .030 29

1933 .116 13 1983 -.808 29

1934 -.138 13 1984 -.203 29

1935 -.663 13 1985 -.370 28

1936 -2.266 14 1986 -2.213 29 1

1937 .507 14 1987 -.273 29 1<<

1938 .642 14 1988 .588 29

1939 .061 14 1989 .106 29

1940 -.931 14 1990 .270 29

1941 -.355 15 1991 .049 29

1892 -.391 1 1942 1.148 16 1992 -.674 29

1893 .218 1 1943 .417 17 1993 -1.273 29

1894 1.390 1 1944 .761 19 1994 .304 29

1895 .664 1 1945 .106 19 1995 .836 29

1896 1.159 1 1946 -1.204 20 1996 .713 29

1897 2.009 1 1947 -.148 20 1997 -.072 29

1898 1.217 1 1948 -2.789 20 1 1998 -.212 29

1899 1.648 1 1949 -.184 20 1999 1.751 29

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PART 4: Master Bar Plot: test9 13:38 Fri 09 Jun 2017 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

1900-e 1950-------B 2000--------C

1901---a 1951---------D 2001f

1902i 1952-------B 2002---------D

1903g 1953--------C 2003---a

1904h 1954--b 2004--b

1905m 1955------A 2005---a

1906--b 1956----@ 2006-------B

1907----------G 1957--------C 2007------A

1908----------I 1958------A 2008--------B

1909----------G 1959-c 2009--b

1910----@ 1960--------C 2010-c

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

1912------A 1962--c 2012----------G

1913--b 1963------A 2013------B

1914------A 1964-------B 2014---------D

1915------A 1965-----@ 2015l

1916---a 1966--b

1917-c 1967----@

1918-d 1968-d

1919-----@ 1969-----A

1920------A 1970-----@

1921-----@ 1971---------D

1922-e 1972-----A

1923--b 1973-c

1924---------E 1974--b

1925---a 1975--b

1926-------B 1976---b

1927----@ 1977-c

1928f 1978---------D

1929----@ 1979-------B

1930---------C 1980-------B

1931----------F 1981------A

1932--------C 1982-----@

1933-----@ 1983-c

1934----a 1984----a

1935--c 1985---a

1936i 1986i

1937-------B 1987---a

1938--------C 1988--------B

1939-----@ 1989-----@

1940-d 1990------A

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

1892---b 1942---------E 1992--c

1893------A 1943-------B 1993-e

1894----------F 1944--------C 1994------A

1895--------C 1945-----@ 1995---------C

1896---------E 1946-e 1996--------C

1897----------H 1947----a 1997----@

1898---------E 1948k 1998---a

1899----------G 1949----a 1999----------G

PART 5: CORRELATION OF SERIES BY SEGMENTS: test9 13:38 Fri 09 Jun 2017 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 223A 1952 2015 .62 .67

2 223B 1951 2015 .35 .62

3 229B 1954 2015 .44 .70

4 233A 1936 2015 .21B .42 .65

5 233B 1921 2015 .57 .58 .29A .46

6 240A 1916 2015 .57 .55 .48 .60

7 240B 1910 2015 .26A .40 .50 .59

8 274A 1941 2015 .68 .48 .54

9 274B 1942 2015 .40 .29A .38

10 278A 1950 2015 .41 .58

11 278B 1986 2015 .44

12 278B2 1943 1984 .23A

13 283A 1910 2015 .59 .66 .47 .15B

14 283B 1924 2015 .49 .51 .41 .21A

15 350A 1966 2015 .30A

16 350B 1966 2015 .61

17 351A 1903 2015 .57 .49 .43 .32A

18 351B 1978 2015 .33

19 351B2 1892 1974 .49 .36

20 352A 1925 2015 .42 .36 .38B

21 352B 1932 2015 .28B .37 .56

22 353A 1910 2015 .26B .11B .30B .58

23 353B 1901 2015 .36 .26B .38 .68

24 354A 1946 2015 .38 .29A .59

25 354B 1944 2015 .24A .21B .63

26 361A 1980 2015 .52

27 361B 1980 2015 .47

28 368A 1915 2015 .60 .62 .33A .52

29 368B 1911 2015 .67 .67 .10B .31A

30 369A 1944 2015 .62 .54 .70

31 369B 1971 2015 .67

Av segment correlation .49 .43 .40 .51

PART 6: POTENTIAL PROBLEMS: test9 13:38 Fri 09 Jun 2017 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

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

223A 1952 to 2015 64 years Series 1

[B] Entire series, effect on correlation ( .649) is:

Lower 2002< -.025 1961< -.018 1977> -.015 1967< -.012 2009> -.010 1993< -.009 Higher 2015 .079 2001 .022

223A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1952 250 269 198 304 226 263 213 188

1960 212 168 177 198 209 210 156 131 122 135

1970 178 169 170 104 151 119 148 194 229 207

1980 220 227 228 137 177 204 145 158 235 191

1990 206 194 154 99 156 214 208 156 179 233

2000 205 92 123 132 143 112 156 155 143 165

2010 144 159 216 142 190 9

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

223B 1951 to 2015 65 years Series 2

[B] Entire series, effect on correlation ( .521) is:

Lower 1951< -.029 1959> -.028 1961< -.022 1963< -.014 1966> -.013 1990> -.012 Higher 2015 .036 1986 .026

223B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1951 306 328 364 317 412 407 403 333 382

1960 367 284 274 267 282 330 341 296 262 297

1970 274 282 245 199 193 202 190 227 283 277

1980 259 285 257 175 196 233 165 235 216 168

1990 326 277 245 166 199 231 238 229 250 276

2000 269 136 228 230 222 193 228 195 167 108

2010 105 190 279 174 207 12

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

229B 1954 to 2015 62 years Series 3

[B] Entire series, effect on correlation ( .604) is:

Lower 1964< -.049 1990< -.030 1987< -.028 1962> -.017 1958< -.011 1984< -.011 Higher 2015 .141 1986 .035

229B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1954 102 174 193 187 143 157

1960 259 300 249 241 145 155 196 240 201 205

1970 237 248 171 153 190 274 295 167 365 275

1980 272 219 185 181 117 117 73 75 133 172

1990 108 174 158 160 191 254 202 166 188 224

2000 183 162 208 183 193 228 200 204 251 183

2010 118 119 238 166 179 13

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

233A 1936 to 2015 80 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

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

1936 1985 6 .16 .09 .08 .07 .15 -.10 -.22 -.22 .05 -.16 .21|-.15 .28 -.07 .06 -.06 .28\* .00 .06 -.21 .09

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

Lower 1936> -.055 1942< -.051 1968> -.032 1973> -.018 1990< -.016 1993> -.015 Higher 2015 .129 1986 .037

1936 to 1985 segment:

Lower 1942< -.101 1936> -.090 1968> -.058 1973> -.033 1939> -.024 1940> -.011 Higher 1948 .172 1946 .054

233A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1936 461 441 352 423

1940 361 232 143 195 183 175 102 195 119 201

1950 218 274 252 236 207 205 219 197 184 187

1960 189 202 154 173 194 219 179 242 333 378

1970 348 331 319 356 302 273 250 207 234 196

1980 217 173 174 144 153 138 100 191 179 135

1990 107 147 132 150 158 157 144 115 114 152

2000 153 139 177 137 102 119 145 153 189 148

2010 128 168 282 223 281 30

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

233B 1921 to 2015 95 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 0 -.24 -.03 -.10 -.17 .07 .13 .11 -.13 -.01 -.04 .29\*-.09 -.19 .14 -.06 -.12 .09 .14 -.04 -.04 -.09

[B] Entire series, effect on correlation ( .505) is:

Lower 1998< -.066 2001> -.023 1933> -.018 1988< -.012 1956> -.011 1990< -.010 Higher 1948 .064 2015 .052

1950 to 1999 segment:

Lower 1998< -.076 1988< -.025 1956> -.023 1954> -.020 1959> -.018 1983> -.016 Higher 1968 .052 1999 .036

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

1933 +3.0 SD; 1998 -5.5 SD

233B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 288 209 198 243 222 237 233 248 313

1930 296 393 347 623 466 335 230 287 356 362

1940 218 204 284 225 232 171 123 196 101 207

1950 216 281 224 213 240 258 296 262 210 217

1960 196 214 192 232 235 208 160 150 128 180

1970 157 183 201 158 182 205 155 140 154 164

1980 207 201 180 169 177 113 103 143 104 103

1990 78 98 98 118 151 151 161 112 61 160

2000 162 174 230 188 154 192 176 160 200 175

2010 114 171 380 216 261 5

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

240A 1916 to 2015 100 years Series 6

[B] Entire series, effect on correlation ( .626) is:

Lower 1948> -.045 1918> -.016 1964< -.013 1976> -.010 1961< -.009 2003> -.006 Higher 1936 .024 2001 .016

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

1986 -2.213 29 1

2015 -3.032 29 6

>> WARNING: Last ring in series is ABSENT

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

1986 -5.4 SD

240A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 233 218 239 244

1920 228 227 185 196 265 170 190 165 145 195

1930 220 204 202 172 174 153 93 188 213 130

1940 106 198 208 208 172 179 146 178 178 279

1950 276 251 214 209 147 164 121 97 81 23

1960 71 49 33 47 25 30 32 38 26 42

1970 53 51 45 40 37 33 54 35 46 43

1980 31 22 31 16 23 23 0 12 31 22

1990 21 29 29 29 37 44 44 42 30 48

2000 47 20 35 36 35 25 23 21 28 21

2010 6 27 28 16 35 0

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

240B 1910 to 2015 106 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

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

1910 1959 0 .09 -.07 .14 .14 .00 .04 -.28 -.09 -.23 -.12 .26\*-.15 -.11 -.01 -.05 .00 .10 -.07 .23 .08 -.15

[B] Entire series, effect on correlation ( .435) is:

Lower 1959< -.024 1930< -.019 1911< -.018 1918> -.016 1936> -.009 1922> -.008 Higher 2015 .046 1986 .040

1910 to 1959 segment:

Lower 1930< -.035 1918> -.031 1911< -.029 1916> -.014 1922> -.013 1959< -.011 Higher 1928 .041 1948 .024

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

1959 -6.2 SD

240B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1910 77 113 156 98 98 239 271 221 275 264

1920 267 237 201 169 175 142 169 160 96 117

1930 112 125 142 133 119 106 109 145 159 139

1940 113 125 122 111 106 116 86 85 78 121

1950 121 117 127 97 80 93 98 106 76 20

1960 73 89 66 89 68 48 60 74 77 92

1970 119 111 101 56 47 31 56 58 70 82

1980 66 52 71 79 88 105 46 60 87 89

1990 74 99 88 93 96 103 128 123 102 142

2000 178 129 179 154 191 218 269 253 253 229

2010 198 243 237 178 155 30

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

274A 1941 to 2015 75 years Series 8

[B] Entire series, effect on correlation ( .714) is:

Lower 1970< -.026 1949< -.021 1976< -.019 1987< -.012 1992> -.011 1954> -.011 Higher 2015 .068 1948 .049

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

2015 -3.032 29 6

>> WARNING: Last ring in series is ABSENT

274A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1941 107 196 157 134 162 76 143 53 97

1950 153 164 128 131 139 107 115 156 136 85

1960 137 139 103 138 133 117 119 155 101 109

1970 83 164 137 98 128 128 81 121 175 111

1980 130 153 140 100 129 106 95 107 141 110

1990 124 112 144 127 140 117 150 142 139 126

2000 125 70 147 72 74 91 130 78 84 67

2010 54 57 78 35 30 0

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

274B 1942 to 2015 74 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

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

1950 1999 0 -.12 -.06 -.17 .18 .12 -.24 -.11 .11 -.23 -.07 .29\*-.02 .09 .11 .26 -.30 -.17 .12 .03 .02 .02

[B] Entire series, effect on correlation ( .441) is:

Lower 1999< -.077 1989< -.045 1944< -.019 1954> -.013 1948> -.011 1992> -.010 Higher 2015 .080 2012 .018

1950 to 1999 segment:

Lower 1999< -.143 1989< -.041 1954> -.025 1992> -.019 1963< -.013 1993> -.011 Higher 1978 .033 1986 .028

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

1998 1999 -4.1 SD

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

2015 -3.032 29 6

>> WARNING: Last ring in series is ABSENT

274B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1942 116 80 62 86 59 78 65 107

1950 199 235 176 184 179 139 159 191 176 122

1960 107 123 86 84 68 52 56 93 72 80

1970 85 131 93 77 96 55 80 75 209 143

1980 273 267 207 135 148 163 136 221 287 168

1990 245 234 266 224 265 237 242 170 167 89

2000 124 68 146 65 61 56 45 38 49 57

2010 51 50 73 38 37 0

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

278A 1950 to 2015 66 years Series 10

[B] Entire series, effect on correlation ( .471) is:

Lower 1953< -.033 1959> -.017 1951< -.015 1986> -.015 1954< -.012 1962> -.012 Higher 2012 .021 2001 .021

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

1954 -5.6 SD

278A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1950 322 274 268 236 210 281 264 275 328 328

1960 309 320 309 398 333 350 325 351 195 254

1970 281 270 220 143 145 139 138 133 219 223

1980 258 246 148 133 189 104 107 173 432 222

1990 121 105 95 63 81 73 90 76 67 88

2000 61 41 63 46 41 36 39 36 28 34

2010 26 75 89 30 40 8

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

278B 1986 to 2015 30 years Series 11

[B] Entire series, effect on correlation ( .442) is:

Lower 1986> -.102 2001> -.073 2008< -.028 1990< -.022 2013< -.018 1989> -.017 Higher 2015 .203 1999 .044

278B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1986 106 103 82 119

1990 72 69 54 47 65 111 74 75 74 143

2000 105 114 135 90 97 102 110 79 46 44

2010 39 74 103 29 33 5

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

278B2 1943 to 1984 42 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

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

1943 1984 0 .12 .11 -.07 .15 .13 -.04 -.23 -.02 .14 .05 .23\*-.09 .16 -.08 -.04 -.26 -.04 -.07 -.02 .13 -.07

[B] Entire series, effect on correlation ( .233) is:

Lower 1948> -.177 1950< -.042 1949< -.019 1959> -.019 1955< -.017 1962> -.016 Higher 1968 .069 1946 .040

1943 to 1984 segment:

Lower 1948> -.177 1950< -.042 1949< -.019 1959> -.019 1955< -.017 1962> -.016 Higher 1968 .069 1946 .040

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

1948 1949 -4.2 SD

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

1948 +3.3 SD

278B2 Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1943 238 306 223 192 245 267 219

1950 193 244 243 286 222 213 218 257 288 278

1960 313 309 270 314 275 298 248 227 140 180

1970 165 194 168 93 126 97 125 110 138 124

1980 89 114 68 68 43

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

283A 1910 to 2015 106 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

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

1966 2015 -8 -.15 -.07 .25\* .06 -.01 .02 .11 .06 -.10 -.06 .15| - - - - - - - - - -

[B] Entire series, effect on correlation ( .396) is:

Lower 2015> -.149 2008< -.016 1939< -.013 1923< -.010 1916> -.010 1955< -.009 Higher 1948 .086 1936 .021

1966 to 2015 segment:

Lower 2015> -.298 2008< -.035 1987< -.012 1997> -.011 1983> -.011 1967< -.007 Higher 1999 .067 1978 .036

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

2014 2015 4.4 SD

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

2009 -6.2 SD; 2015 +4.9 SD

283A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1910 221 289 204 176 207 191 214 209 184 194

1920 190 152 140 133 180 167 186 197 169 217

1930 285 298 258 244 255 283 198 314 319 191

1940 181 254 250 225 270 242 217 275 172 194

1950 193 236 256 262 221 199 234 256 270 250

1960 270 290 224 255 314 210 167 158 175 180

1970 192 204 155 134 138 170 145 167 268 259

1980 298 231 189 196 192 142 118 99 142 129

1990 96 89 76 75 86 99 86 106 88 116

2000 88 66 78 57 52 48 41 35 23 13

2010 13 16 11 5 5 3

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

283B 1924 to 2015 92 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

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

1966 2015 0 .07 -.01 .21 -.06 .07 .03 -.09 -.15 -.11 .08 .21\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .315) is:

Lower 2015> -.048 1998< -.036 2011< -.032 1946> -.011 1983> -.009 1996< -.008 Higher 1986 .034 1948 .023

1966 to 2015 segment:

Lower 2015> -.073 2011< -.048 1998< -.043 1983> -.013 1996< -.013 1978< -.011 Higher 1986 .063 2014 .022

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

2013 .375 29 1 >> WARNING: Ring is not usually narrow

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

1998 -4.5 SD

283B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 178 159 168 171 160 197

1930 254 305 326 305 292 260 191 276 224 93

1940 74 127 161 151 214 256 287 395 251 352

1950 310 375 344 338 222 245 212 267 288 253

1960 239 252 162 153 200 149 131 117 101 131

1970 144 198 193 173 157 156 122 102 100 121

1980 142 107 99 113 115 91 66 83 115 131

1990 100 81 63 68 64 70 50 52 25 43

2000 48 42 54 55 41 56 53 51 33 12

2010 20 3 13 0 11 4

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

350A 1966 to 2015 50 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

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

1966 2015 0 -.07 -.24 .21 .02 -.06 -.17 .20 .24 -.14 .04 .30\* - - - - - - - - - -

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

Lower 1975> -.039 1967< -.037 1969< -.026 1994< -.023 1983> -.021 1968> -.021 Higher 2015 .263 1986 .035

1966 to 2015 segment:

Lower 1975> -.039 1967< -.037 1969< -.026 1994< -.023 1983> -.021 1968> -.021 Higher 2015 .263 1986 .035

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

2015 -3.032 29 6

>> WARNING: Last ring in series is ABSENT

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

1975 +3.7 SD

350A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1966 51 44 74 62

1970 65 102 107 122 121 210 151 150 175 154

1980 129 168 184 192 182 151 122 145 177 137

1990 160 170 142 145 144 189 181 171 184 234

2000 165 158 197 188 143 144 179 143 139 111

2010 115 88 114 90 102 0

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

350B 1966 to 2015 50 years Series 16

[B] Entire series, effect on correlation ( .609) is:

Lower 1977> -.032 2000< -.031 1968> -.025 1967< -.025 1975> -.024 1997< -.024 Higher 2015 .199 1986 .018

350B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1966 42 44 96 105

1970 106 169 157 168 163 261 196 262 271 263

1980 226 247 240 203 191 168 159 209 239 219

1990 263 269 207 195 218 238 190 131 137 184

2000 123 123 155 128 96 88 131 137 128 110

2010 113 100 148 90 146 7

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

351A 1903 to 2015 113 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

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

1966 2015 0 .12 .11 .06 -.07 .11 .00 -.08 -.26 .16 -.13 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .449) is:

Lower 2001> -.025 2006< -.021 1948> -.018 1983< -.018 1986> -.015 1972< -.015 Higher 2015 .031 1936 .016

1966 to 2015 segment:

Lower 2001> -.051 2006< -.037 1986> -.030 2011< -.025 1972< -.023 1983< -.013 Higher 2015 .093 1999 .038

351A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1903 50 32 15 46 132 159 162

1910 110 174 118 96 109 115 88 96 62 118

1920 131 152 156 180 202 188 162 142 135 185

1930 254 317 242 234 212 221 172 219 197 200

1940 156 194 259 218 252 219 185 184 198 280

1950 261 297 272 257 208 201 203 220 193 178

1960 243 209 181 208 213 199 174 179 153 197

1970 145 125 94 106 96 111 108 75 88 97

1980 106 90 69 43 60 55 61 75 68 71

1990 78 54 48 41 54 49 51 44 44 53

2000 42 43 36 32 31 21 12 22 24 22

2010 14 5 27 15 20 3

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

351B 1978 to 2015 38 years Series 18

[B] Entire series, effect on correlation ( .330) is:

Lower 2015> -.218 2011< -.049 2003> -.027 1985< -.011 1988< -.010 1984> -.006 Higher 1986 .136 1999 .030

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

2015 +3.4 SD

351B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1978 118 122

1980 100 94 88 72 94 54 28 46 38 31

1990 32 26 20 19 28 26 29 22 21 28

2000 30 19 26 29 18 20 17 19 13 5

2010 6 3 6 6 5 4

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

351B2 1892 to 1974 83 years Series 19

[\*] Early part of series cannot be checked from 1892 to 1900 -- not matched by another series

[B] Entire series, effect on correlation ( .437) is:

Lower 1949< -.029 1902> -.028 1962> -.020 1971< -.018 1938< -.016 1959> -.014 Higher 1936 .053 1905 .033

351B2 Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1892 122 125 143 128 137 160 136 148

1900 71 65 48 47 34 7 84 187 206 202

1910 105 135 139 140 164 131 113 138 108 155

1920 188 216 160 170 228 237 312 272 248 217

1930 260 329 273 213 206 203 151 194 181 194

1940 200 229 288 249 242 214 202 190 183 166

1950 216 261 233 238 192 192 186 189 192 202

1960 218 206 200 179 167 140 126 160 151 127

1970 128 101 87 73 70

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

352A 1925 to 2015 91 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

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

1966 2015 -9 .01 .40\*-.23 -.10 .19 -.16 -.13 .11 .07 -.09 .38| - - - - - - - - - -

[B] Entire series, effect on correlation ( .472) is:

Lower 1995< -.044 1962> -.015 1939> -.014 1934< -.014 1979< -.013 2001> -.009 Higher 2015 .075 1986 .038

1966 to 2015 segment:

Lower 1995< -.075 1979< -.022 2001> -.018 1977> -.013 1981< -.013 1997> -.012 Higher 2015 .117 1986 .061

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

2015 -3.032 29 6

>> WARNING: Last ring in series is ABSENT

352A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1925 188 238 246 229 299

1930 297 298 313 305 242 256 263 328 369 429

1940 340 348 436 362 421 278 279 341 230 421

1950 316 303 227 213 195 199 141 160 133 126

1960 129 126 142 127 124 101 108 119 44 64

1970 70 86 58 65 55 43 59 59 61 40

1980 44 41 58 50 56 67 45 73 78 83

1990 96 83 89 80 90 74 95 116 94 144

2000 114 103 105 110 95 114 97 116 133 91

2010 76 118 102 74 94 0

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

352B 1932 to 2015 84 years Series 21

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

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

1932 1981 -8 .10 .14 .31\* .00 .07 -.21 -.11 -.21 .10 -.24 .28| .01 .05 .08 -.04 -.02 .05 -.11 -.07 -.11 -.16

[B] Entire series, effect on correlation ( .483) is:

Lower 1956< -.071 1936> -.043 1959> -.027 1997> -.010 1939> -.009 1979< -.009 Higher 2015 .076 1948 .041

1932 to 1981 segment:

Lower 1956< -.076 1936> -.072 1959> -.044 1939> -.016 1979< -.013 1940> -.012 Higher 1948 .116 1968 .055

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

2015 -3.032 29 6

>> WARNING: Last ring in series is ABSENT

352B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1932 246 233 228 214 280 298 303 326

1940 299 323 383 280 235 176 200 200 146 214

1950 230 231 210 223 187 185 117 180 169 206

1960 164 141 126 156 160 147 145 157 78 103

1970 91 93 76 64 63 53 66 60 54 39

1980 39 34 30 23 28 37 32 49 61 58

1990 57 62 68 58 80 81 75 92 72 100

2000 92 76 92 90 85 103 92 101 108 86

2010 72 122 132 115 119 0

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

353A 1910 to 2015 106 years Series 22

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

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

1910 1959 -7 -.25 -.23 .07 .31\*-.23 .10 .00 -.07 -.09 .13 .26| .07 -.37 .00 -.24 .07 .03 .14 .00 -.01 -.03

1925 1974 7 -.11 -.15 .06 .22 -.05 -.04 -.10 -.14 .03 .18 .11| .12 -.33 .03 -.29 -.06 -.12 .26\* .01 .03 -.20

1950 1999 9 -.09 .11 -.16 .05 -.02 .05 -.01 .05 .02 -.08 .30|-.18 -.30 .05 .02 .08 .05 -.04 -.04 .45\*-.11

[B] Entire series, effect on correlation ( .453) is:

Lower 1977< -.037 1947< -.028 1936> -.017 1939> -.013 1988< -.012 2002< -.011 Higher 2015 .123 1924 .015

1910 to 1959 segment:

Lower 1947< -.065 1939> -.031 1936> -.027 1946> -.020 1929< -.019 1916> -.015 Higher 1924 .054 1911 .031

1925 to 1974 segment:

Lower 1947< -.067 1939> -.029 1973> -.025 1929< -.023 1966> -.017 1946> -.015 Higher 1948 .055 1959 .036

1950 to 1999 segment:

Lower 1988< -.031 1973> -.030 1977< -.023 1966> -.020 1955< -.014 1951< -.014 Higher 1986 .067 1959 .034

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

1976 1977 -4.5 SD

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

1948 -2.789 20 1

1950 .437 21 1 >> WARNING: Ring is not usually narrow

1956 -.113 24 1 >> WARNING: Ring is not usually narrow

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

1977 -4.8 SD

353A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1910 172 222 140 133 240 259 229 130 99 89

1920 93 81 69 86 135 107 104 86 72 62

1930 66 74 70 61 74 74 74 73 81 135

1940 108 93 152 126 156 174 139 21 0 9

1950 0 3 7 3 14 6 0 5 11 2

1960 7 9 9 15 15 17 24 30 25 24

1970 25 37 31 39 23 31 29 4 20 33

1980 36 28 30 37 70 85 65 86 74 88

1990 153 142 133 133 192 210 190 169 169 193

2000 146 106 94 83 74 76 104 102 105 96

2010 57 119 144 96 87 7

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

353B 1901 to 2015 115 years Series 23

[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 7 -.14 -.33 -.15 .06 .04 .20 -.05 .25 -.18 -.04 .26|-.05 -.20 -.07 -.13 -.11 -.05 .30\* .08 .17 -.30

[B] Entire series, effect on correlation ( .510) is:

Lower 1936> -.052 1916< -.014 1978< -.014 1981< -.009 1939< -.008 1996< -.008 Higher 2015 .087 1948 .018

1925 to 1974 segment:

Lower 1936> -.123 1931< -.016 1950< -.014 1951< -.013 1941< -.013 1927> -.013 Higher 1948 .114 1959 .030

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

1936 +3.2 SD

353B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1901 42 9 3 28 8 94 147 171 146

1910 159 209 163 166 214 194 97 84 87 106

1920 122 96 88 115 167 145 134 141 109 109

1930 113 98 79 62 81 74 109 90 98 49

1940 60 33 87 82 108 133 101 55 22 35

1950 28 28 23 26 30 42 43 54 69 36

1960 61 73 65 86 83 73 77 85 65 61

1970 59 63 50 39 37 29 33 22 21 31

1980 28 20 24 31 48 59 48 53 56 84

1990 134 124 130 100 134 173 131 127 149 199

2000 157 113 139 120 112 96 128 115 115 74

2010 53 128 173 94 82 5

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

354A 1946 to 2015 70 years Series 24

[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 -.03 -.08 .22 -.03 .07 -.20 .15 .06 -.18 .00 .29\* .09 -.24 -.03 .00 -.25 .08 .04 -.02 -.03 .01

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

Lower 1986> -.059 1946> -.022 1954> -.016 1994< -.012 1990< -.011 1959> -.011 Higher 2015 .098 1948 .051

1950 to 1999 segment:

Lower 1986> -.120 1954> -.031 1994< -.024 1959> -.019 1977> -.017 1990< -.016 Higher 1962 .065 1999 .046

354A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 55 66 9 8

1950 21 27 38 54 67 49 45 63 56 45

1960 39 61 7 9 45 57 38 19 7 39

1970 38 81 65 63 55 50 53 170 292 296

1980 367 345 362 333 379 348 423 430 491 426

1990 346 385 325 357 340 376 352 319 378 430

2000 365 280 350 262 298 373 344 331 351 236

2010 309 286 335 148 171 7

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

354B 1944 to 2015 72 years Series 25

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

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

1944 1993 0 .12 -.08 .08 .03 .24 -.10 -.07 .08 .14 -.02 .24\* .02 -.05 -.18 -.29 -.19 .02 -.06 .08 .14 .10

1950 1999 1 .04 -.11 .20 .01 .19 -.10 .07 .09 .08 -.08 .21| .21\*-.19 -.23 -.09 -.21 -.03 -.02 .07 .17 .09

[B] Entire series, effect on correlation ( .569) is:

Lower 1986> -.072 1948> -.029 1967< -.016 1983> -.012 1998> -.011 1954> -.010 Higher 2015 .135 2001 .027

1944 to 1993 segment:

Lower 1986> -.113 1967< -.026 1983> -.017 1954> -.015 1951< -.015 1950< -.014 Higher 1962 .055 1946 .021

1950 to 1999 segment:

Lower 1986> -.147 1967< -.024 1983> -.022 1998> -.020 1954> -.019 1951< -.017 Higher 1962 .088 1999 .031

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

1962 -.646 24 1

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

1986 +3.2 SD

354B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1944 136 67 14 62 25 13

1950 6 9 10 51 46 39 28 43 40 29

1960 26 51 0 35 46 54 33 7 9 41

1970 46 96 74 78 68 73 56 158 232 240

1980 249 329 349 366 352 320 423 435 419 354

1990 366 307 243 256 310 339 331 306 381 391

2000 333 237 323 249 241 307 270 254 313 209

2010 224 275 298 170 211 7

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

361A 1980 to 2015 36 years Series 26

[B] Entire series, effect on correlation ( .516) is:

Lower 2001> -.042 1985> -.041 1996< -.038 1982< -.035 1998> -.029 1995< -.024 Higher 2015 .302 1999 .023

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

1985 +3.2 SD

361A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1980 56 57 53 71 125 196 104 150 162 163

1990 200 182 205 182 215 196 190 208 295 276

2000 257 250 248 209 283 196 285 207 338 271

2010 167 284 273 253 233 22

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

361B 1980 to 2015 36 years Series 27

[B] Entire series, effect on correlation ( .471) is:

Lower 1988< -.053 2005< -.046 1998> -.040 1993> -.032 1983> -.027 1992> -.019 Higher 2015 .214 1986 .086

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

1998 +3.5 SD

361B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1980 112 194 117 172 116 136 95 126 119 155

1990 188 182 218 232 219 207 211 184 336 266

2000 206 183 191 174 228 140 202 170 279 243

2010 137 257 234 247 308 45

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

368A 1915 to 2015 101 years Series 28

[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 -.16 .00 .07 .03 -.15 .00 -.05 -.01 -.12 .01 .33\*-.08 .25 .23 -.13 -.27 .14 .12 -.15 -.05 .04

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

Lower 1987< -.054 1918> -.029 1968> -.024 1977> -.010 1971< -.009 1922> -.008 Higher 2015 .068 1948 .047

1950 to 1999 segment:

Lower 1987< -.110 1968> -.069 1977> -.029 1971< -.022 1973> -.013 1963< -.012 Higher 1986 .089 1962 .044

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

1986 1987 -4.3 SD

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

1987 -.273 29 1 >> WARNING: Ring is not usually narrow

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

1987 -6.0 SD

368A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1915 68 74 78 154 115

1920 107 113 128 178 200 164 182 163 145 169

1930 212 194 188 177 180 172 126 191 190 184

1940 184 175 223 228 189 179 173 164 123 183

1950 179 196 210 185 175 197 165 162 172 128

1960 152 148 90 86 97 77 47 77 102 106

1970 81 58 67 59 46 34 45 47 43 29

1980 31 27 25 25 17 24 16 0 32 36

1990 38 38 64 75 75 98 124 120 127 150

2000 121 107 143 132 150 171 172 176 155 165

2010 122 147 131 96 94 7

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

368B 1911 to 2015 105 years Series 29

[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 6 .15 -.17 .04 -.19 -.02 -.12 -.08 .00 -.12 .26 .10|-.19 .07 .17 -.15 .03 .31\* .01 -.11 .06 .24

1966 2015 0 .15 -.18 -.05 -.06 .03 .00 -.13 -.19 .03 .08 .31\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .507) is:

Lower 1999< -.025 1978< -.025 1987< -.019 1914< -.019 1954> -.013 1993> -.010 Higher 1948 .070 2015 .043

1950 to 1999 segment:

Lower 1978< -.065 1999< -.062 1987< -.040 1954> -.033 1993> -.025 1975> -.016 Higher 1986 .084 1962 .063

1966 to 2015 segment:

Lower 1978< -.058 1999< -.053 1987< -.049 1993> -.021 1991< -.018 1975> -.013 Higher 2015 .248 1986 .039

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

1936 -5.0 SD; 1948 -4.8 SD

368B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1911 70 64 68 51 64 68 59 73 138

1920 147 160 138 180 229 206 197 175 165 179

1930 198 202 165 163 157 122 78 126 133 151

1940 148 128 147 151 156 142 118 120 55 127

1950 148 149 162 143 170 182 135 130 131 101

1960 104 125 87 99 120 88 74 114 105 89

1970 98 99 97 90 86 96 72 70 48 49

1980 50 42 57 37 40 47 34 21 43 67

1990 88 52 57 68 63 69 80 76 74 62

2000 58 58 72 67 68 76 75 87 75 96

2010 90 138 151 147 154 8

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

369A 1944 to 2015 72 years Series 30

[B] Entire series, effect on correlation ( .705) is:

Lower 2001> -.035 1957< -.019 1970< -.015 1958< -.010 1988< -.009 2013> -.008 Higher 2015 .111 1948 .023

369A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1944 91 82 41 66 32 63

1950 76 92 70 107 73 75 65 39 27 26

1960 54 54 32 30 36 32 34 28 31 62

1970 34 48 50 37 52 43 80 93 238 202

1980 163 121 117 117 102 83 64 122 98 74

1990 82 86 73 56 149 145 147 136 136 176

2000 192 173 212 139 116 110 152 115 132 87

2010 90 105 139 143 101 7

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

369B 1971 to 2015 45 years Series 31

[B] Entire series, effect on correlation ( .672) is:

Lower 1977< -.093 1986> -.020 1973> -.015 1980< -.008 1979< -.008 1989> -.008 Higher 2015 .118 2001 .016

369B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1971 73 84 83 76 63 89 48 154 103

1980 104 130 153 128 130 137 141 245 234 219

1990 199 184 160 165 205 231 225 186 150 196

2000 165 138 207 147 124 155 158 129 132 110

2010 128 136 187 121 104 5

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

PART 7: DESCRIPTIVE STATISTICS: test9 13:38 Fri 09 Jun 2017 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 223A 1952 2015 64 2 0 .649 1.77 3.04 .486 .429 .230 2.63 .519 -.015 1

2 223B 1951 2015 65 2 0 .521 2.49 4.12 .749 .695 .195 2.58 .399 -.044 1

3 229B 1954 2015 62 2 0 .604 1.89 3.65 .600 .459 .249 2.69 .516 .044 1

4 233A 1936 2015 80 3 1 .513 2.05 4.61 .841 .785 .201 2.64 .482 -.008 1

5 233B 1921 2015 95 4 1 .505 2.05 6.23 .867 .680 .229 2.73 .423 .012 1

6 240A 1916 2015 100 4 0 .626 .99 2.79 .839 .935 .321 2.50 .355 -.011 1

7 240B 1910 2015 106 4 1 .435 1.24 2.75 .612 .859 .217 2.37 .394 -.046 2

8 274A 1941 2015 75 3 0 .714 1.15 1.96 .357 .391 .292 2.56 .523 .010 1

9 274B 1942 2015 74 3 1 .441 1.27 2.87 .720 .793 .293 2.60 .536 -.082 3

10 278A 1950 2015 66 2 0 .471 1.73 4.32 1.133 .858 .254 3.07 .504 -.009 1

11 278B 1986 2015 30 1 0 .442 .80 1.43 .331 .527 .322 2.81 .776 .110 1

12 278B2 1943 1984 42 1 1 .233 2.01 3.13 .775 .865 .190 2.58 .527 -.001 1

13 283A 1910 2015 106 4 1 .396 1.74 3.19 .824 .889 .175 2.71 .416 .060 1

14 283B 1924 2015 92 4 1 .315 1.52 3.95 .989 .913 .280 2.55 .448 -.042 1

15 350A 1966 2015 50 1 1 .567 1.39 2.34 .464 .711 .202 2.73 .447 .017 1

16 350B 1966 2015 50 1 0 .609 1.65 2.71 .647 .771 .216 2.56 .488 .036 1

17 351A 1903 2015 113 4 1 .449 1.29 3.16 .800 .931 .232 2.66 .463 .043 1

18 351B 1978 2015 38 1 0 .330 .36 1.22 .328 .942 .255 2.54 .522 .100 1

19 351B2 1892 1974 83 2 0 .437 1.71 3.28 .634 .849 .184 2.64 .490 -.050 3

20 352A 1925 2015 91 3 1 .472 1.60 4.36 1.105 .920 .200 2.72 .450 -.035 1

21 352B 1932 2015 84 3 1 .483 1.33 3.83 .848 .932 .180 2.52 .441 -.078 1

22 353A 1910 2015 106 4 3 .453 .82 2.59 .622 .879 .409 2.59 .402 .040 1

23 353B 1901 2015 115 4 1 .510 .87 2.13 .492 .821 .297 2.70 .462 .019 1

24 354A 1946 2015 70 3 1 .568 2.01 4.91 1.565 .939 .326 2.53 .588 -.041 1

25 354B 1944 2015 72 3 2 .569 1.78 4.35 1.401 .931 .385 2.44 .481 -.039 1

26 361A 1980 2015 36 1 0 .516 1.96 3.38 .775 .588 .256 2.72 .540 .020 1

27 361B 1980 2015 36 1 0 .471 1.90 3.36 .619 .222 .284 2.96 .658 -.029 1

28 368A 1915 2015 101 4 1 .497 1.20 2.28 .602 .909 .215 2.44 .356 .014 1

29 368B 1911 2015 105 4 2 .507 1.05 2.29 .474 .845 .186 2.42 .337 .008 1

30 369A 1944 2015 72 3 0 .705 .91 2.38 .506 .770 .286 2.80 .428 -.005 1

31 369B 1971 2015 45 1 0 .672 1.43 2.45 .527 .690 .235 2.56 .508 -.074 1

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Total or mean: 2324 82 21 .504 1.45 6.23 .743 .797 .251 3.07 .459 -.004

- = [ COFECHA TEST9COF ] = -