[] Dendrochronology Program Library Run HHS Program COF 11:15 Mon 27 Nov 2017 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30283

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: HHSG01G10\_TSCA\_corr1-50

File of DATED series: HHSG01G10\_TSCA\_corr1.txt

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 1902 to 2015 114 years

Continuous time span is 1902 to 2015 114 years

Portion with two or more series is 1904 to 2015 112 years

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

\*C\* Number of dated series 39 \*C\*

\*O\* Master series 1902 2015 114 yrs \*O\*

\*F\* Total rings in all series 2237 \*F\*

\*E\* Total dated rings checked 2235 \*E\*

\*C\* Series intercorrelation .557 \*C\*

\*H\* Average mean sensitivity .247 \*H\*

\*A\* Segments, possible problems 13 \*A\*

\*\*\* Mean length of series 57.4 \*\*\*

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

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

10\_115A 1 absent rings: 1957

1 absent rings .045%

PART 2: TIME PLOT OF TREE-RING SERIES: HHSG01G10\_TSCA\_corr1-50 11:15 Mon 27 Nov 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

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

. . . . . . . . . . . . . . . . . . .<====> . 10\_101A 1 1962 2015 54

. . . . . . . . . . . . . . . . . . .<====> . 10\_101B 2 1966 2015 50

. . . . . . . . . . . . . . . . . . <=======> . 10\_108A 3 1939 2015 77

. . . . . . . . . . . . . . . . . . <========> . 10\_108B 4 1927 2015 89

. . . . . . . . . . . . . . . . . . . <===> . 10\_109A 5 1978 2015 38

. . . . . . . . . . . . . . . . . . . <==> . 10\_109B 6 1982 2015 34

. . . . . . . . . . . . . . . . . . <======> . 10\_115A 7 1946 2015 70

. . . . . . . . . . . . . . . . . . <=======> . 10\_115B 8 1937 2015 79

. . . . . . . . . . . . . . . . . <==========> . 10\_116A 9 1904 2015 112

. . . . . . . . . . . . . . . . . . . <===> . 10\_116B 10 1975 2015 41

. . . . . . . . . . . . . . . . . . <======> . 10\_117A 11 1946 2015 70

. . . . . . . . . . . . . . . . . . <======> . 10\_117B 12 1946 2015 70

. . . . . . . . . . . . . . . . . . <=====> . 10\_118A 13 1952 2015 64

. . . . . . . . . . . . . . . . . . <======> . 10\_118B 14 1946 2015 70

. . . . . . . . . . . . . . . . . <==========> . 10\_119A 15 1902 2015 114

. . . . . . . . . . . . . . . . . . .<====> . 10\_120A 16 1960 2015 56

. . . . . . . . . . . . . . . . . . .<====> . 10\_120B 17 1962 2015 54

. . . . . . . . . . . . . . . . . . . <==> . 10\_121A 18 1980 2015 36

. . . . . . . . . . . . . . . . . . . <===> . 10\_121B 19 1976 2015 40

. . . . . . . . . . . . . . . . . . . <==> . 10\_122A 20 1980 2015 36

. . . . . . . . . . . . . . . . . . . <===> . 10\_122B 21 1975 2015 41

. . . . . . . . . . . . . . . . . . .<====> . 10\_123A 22 1962 2015 54

. . . . . . . . . . . . . . . . . . .<====> . 10\_123B 23 1962 2015 54

. . . . . . . . . . . . . . . . . . . <===> . 10\_124A 24 1972 2015 44

. . . . . . . . . . . . . . . . . . .<====> . 10\_124B 25 1965 2015 51

. . . . . . . . . . . . . . . . . . <=======> . 10\_125A 26 1932 2015 84

. . . . . . . . . . . . . . . . . . .<====> . 10\_125B 27 1966 2015 50

. . . . . . . . . . . . . . . . . . . <==> . 10\_126A 28 1987 2015 29

. . . . . . . . . . . . . . . . . . . <==> . 10\_126B 29 1981 2015 35

. . . . . . . . . . . . . . . . . . . <===> . 10\_129A 30 1977 2015 39

. . . . . . . . . . . . . . . . . . .<====> . 10\_129B 31 1964 2015 52

. . . . . . . . . . . . . . . . . .<=========> . 10\_131A 32 1916 2015 100

. . . . . . . . . . . . . . . . . .<=========> . 10\_131B 33 1917 2015 99

. . . . . . . . . . . . . . . . . . .<====> . 10\_159A 34 1968 2015 48

. . . . . . . . . . . . . . . . . . . <==> . 10\_167A 35 1980 2015 36

. . . . . . . . . . . . . . . . . . . <===> . 10\_167B 36 1974 2015 42

. . . . . . . . . . . . . . . . . . . <==> . 10\_218A 37 1982 2015 34

. . . . . . . . . . . . . . . . . . . <==> . 10\_218B 38 1981 2015 35

. . . . . . . . . . . . . . . . . . .<====> . 10\_119B 39 1960 2015 56

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

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: HHSG01G10\_TSCA\_corr1-50 11:15 Mon 27 Nov 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

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

1950 -1.155 12 2000 -.212 39

1951 -.617 12 2001 -1.905 39

1902 -3.056 1 1952 -.375 13 2002 -.893 39

1903 2.123 1 1953 -.653 13 2003 -.510 39

1904 1.048 2 1954 -.784 13 2004 .266 39

1905 .780 2 1955 -1.078 13 2005 .767 39

1906 .369 2 1956 -1.804 13 2006 -1.454 39

1907 1.167 2 1957 -2.040 13 1 2007 .437 39

1908 -.781 2 1958 -1.475 13 2008 .065 39

1909 -1.139 2 1959 -2.115 13 2009 .532 39

1910 -1.861 2 1960 .537 15 2010 1.062 39

1911 -1.890 2 1961 1.575 15 2011 -.473 39

1912 -1.314 2 1962 .595 19 2012 .999 39

1913 -.331 2 1963 1.251 19 2013 .541 39

1914 .071 2 1964 -.118 20 2014 1.163 39

1915 -.357 2 1965 -.303 21 2015 -2.993 39

1916 .157 3 1966 .110 23

1917 1.200 4 1967 .643 23

1918 .826 4 1968 .390 24

1919 -.555 4 1969 .274 24

1920 .393 4 1970 -.438 24

1921 2.010 4 1971 .234 24

1922 .987 4 1972 .123 25

1923 .901 4 1973 1.591 25

1924 -.404 4 1974 .073 26

1925 .527 4 1975 -.714 28

1926 -.075 4 1976 -.469 29

1927 .778 5 1977 -.791 30

1928 -.107 5 1978 .115 31

1929 -.766 5 1979 -.252 31

1930 -1.297 5 1980 .091 34

1931 -1.751 5 1981 -.799 36

1932 -.629 6 1982 -.431 38

1933 .474 6 1983 -.472 38

1934 .276 6 1984 -1.283 38

1935 .731 6 1985 -.960 38

1936 .914 6 1986 -.481 38

1937 .835 7 1987 .477 39

1938 .571 7 1988 1.016 39

1939 1.253 8 1989 -.187 39

1940 1.606 8 1990 .223 39

1941 1.319 8 1991 .338 39

1942 1.186 8 1992 .246 39

1943 .963 8 1993 .300 39

1944 .315 8 1994 -.336 39

1945 1.085 8 1995 1.354 39

1946 1.177 12 1996 .387 39

1947 .831 12 1997 -.185 39

1948 .299 12 1998 .299 39

1949 -.018 12 1999 -.163 39

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PART 4: Master Bar Plot: HHSG01G10\_TSCA\_corr1-50 11:15 Mon 27 Nov 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

1950-e 2000----a

1951--b 2001h

1902l 1952---a 2002-d

1903----------H 1953--c 2003---b

1904---------D 1954--c 2004------A

1905--------C 1955-d 2005--------C

1906------A 1956g 2006-f

1907---------E 1957h 2007-------B

1908--c 1958-f 2008-----@

1909-e 1959h 2009-------B

1910g 1960-------B 2010---------D

1911h 1961----------F 2011---b

1912-e 1962-------B 2012---------D

1913---a 1963---------E 2013-------B

1914-----@ 1964----@ 2014---------E

1915---a 1965---a 2015l

1916-----A 1966-----@

1917---------E 1967-------C

1918--------C 1968------B

1919--b 1969------A

1920------B 1970---b

1921----------H 1971------A

1922---------D 1972-----@

1923--------D 1973----------F

1924---b 1974-----@

1925-------B 1975--c

1926----@ 1976---b

1927--------C 1977--c

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

1929--c 1979----a

1930-e 1980-----@

1931g 1981--c

1932--c 1982---b

1933-------B 1983---b

1934------A 1984-e

1935--------C 1985-d

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

1937--------C 1987-------B

1938-------B 1988---------D

1939---------E 1989----a

1940----------F 1990------A

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

1942---------E 1992------A

1943---------D 1993------A

1944------A 1994---a

1945---------D 1995----------E

1946---------E 1996------B

1947--------C 1997----a

1948------A 1998------A

1949----@ 1999----a

PART 5: CORRELATION OF SERIES BY SEGMENTS: HHSG01G10\_TSCA\_corr1-50 11:15 Mon 27 Nov 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 10\_101A 1962 2015 .50 .56

2 10\_101B 1966 2015 .72

3 10\_108A 1939 2015 .38 .48 .82

4 10\_108B 1927 2015 .46 .48 .79

5 10\_109A 1978 2015 .57

6 10\_109B 1982 2015 .73

7 10\_115A 1946 2015 .46 .43 .69 Re-measure starting with 50. Took zero out of ring 59.

8 10\_115B 1937 2015 .28A .34 .49 Re-measure starting with 50.

9 10\_116A 1904 2015 .20B .45 .30A .48 Truncate after ring 91

10 10\_116B 1975 2015 .48 Re-measured core

11 10\_117A 1946 2015 .54 .59 .76

12 10\_117B 1946 2015 .62 .63 .78

13 10\_118A 1952 2015 .64 .79

14 10\_118B 1946 2015 .21B .58 .72 OK- complacent growth

15 10\_119A 1902 2015 -.11B .13B .20B .57 Removed core

16 10\_120A 1960 2015 .32A .41

17 10\_120B 1962 2015 .53 .71

18 10\_121A 1980 2015 .71

19 10\_121B 1976 2015 .67

20 10\_122A 1980 2015 .58

21 10\_122B 1975 2015 .54

22 10\_123A 1962 2015 .30A .46 OK- complacent growth

23 10\_123B 1962 2015 .36 .38 Truncate after ring 48. Otherwise complacent growth

24 10\_124A 1972 2015 .74

25 10\_124B 1965 2015 .44 .66

26 10\_125A 1932 2015 .35B .31A .59 Zero added to ring 66.

27 10\_125B 1966 2015 .48

28 10\_126A 1987 2015 .50

29 10\_126B 1981 2015 .69

30 10\_129A 1977 2015 .55

31 10\_129B 1964 2015 .51 .57

32 10\_131A 1916 2015 .59 .51 .40 .62 Truncate after ring 91

33 10\_131B 1917 2015 .36 .46 .57 .70 Truncate after ring 91

34 10\_159A 1968 2015 .40

35 10\_167A 1980 2015 .80

36 10\_167B 1974 2015 .69

37 10\_218A 1982 2015 .57

38 10\_218B 1981 2015 .49

39 10\_119B 1960 2015 .30A .14B Removed core

Av segment correlation .26 .40 .47 .60

PART 6: POTENTIAL PROBLEMS: HHSG01G10\_TSCA\_corr1-50 11:15 Mon 27 Nov 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

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10\_101A 1962 to 2015 54 years Series 1

[B] Entire series, effect on correlation ( .559) is:

Lower 1990< -.100 2008> -.017 1981> -.010 1983> -.010 2001> -.010 1986> -.009 Higher 2015 .056 2006 .042

10\_101A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1962 323 395 321 295 359 364 473 538

1970 322 417 435 619 374 284 332 355 360 267

1980 357 340 252 402 238 302 385 302 218 143

1990 88 149 199 238 134 262 140 142 152 133

2000 103 121 151 147 169 174 73 130 240 150

2010 151 95 120 98 124 47

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

10\_101B 1966 to 2015 50 years Series 2

[B] Entire series, effect on correlation ( .717) is:

Lower 1971< -.049 1993< -.021 2011> -.011 1997> -.011 1976> -.010 1984> -.010 Higher 2015 .156 2006 .029

10\_101B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1966 322 303 266 224

1970 156 167 311 319 263 210 261 225 278 187

1980 188 215 238 228 217 182 216 281 267 136

1990 154 165 189 166 172 306 193 211 200 190

2000 130 119 160 165 196 199 88 134 138 158

2010 140 111 115 87 108 39

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

10\_108A 1939 to 2015 77 years Series 3

[B] Entire series, effect on correlation ( .673) is:

Lower 1961< -.022 1989> -.021 2003> -.020 1941< -.016 1940< -.016 1949< -.016 Higher 2015 .179 2006 .023

10\_108A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1939 72

1940 40 19 20 21 32 27 16 11 24 9

1950 10 8 7 7 7 5 5 5 8 11

1960 115 94 79 102 121 135 186 290 337 290

1970 206 214 153 218 175 157 152 113 171 156

1980 158 124 154 148 130 139 206 200 282 370

1990 374 391 390 377 333 385 341 321 319 369

2000 348 287 339 450 404 388 277 355 322 367

2010 346 235 288 327 349 134

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

10\_108B 1927 to 2015 89 years Series 4

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

Lower 1961< -.019 1949< -.018 1989> -.014 1938< -.011 1934> -.011 1970> -.008 Higher 2015 .119 2006 .022

10\_108B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1927 21 13 9

1930 11 14 20 48 75 85 60 54 29 74

1940 76 62 54 41 24 44 46 39 54 16

1950 6 13 6 11 13 9 8 7 6 5

1960 36 38 85 115 100 79 83 128 162 125

1970 129 113 101 208 145 139 130 88 161 132

1980 132 76 78 95 85 78 70 128 189 286

1990 381 316 368 370 277 245 256 201 203 265

2000 189 159 184 195 199 228 148 190 184 179

2010 184 133 137 160 208 113

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

10\_109A 1978 to 2015 38 years Series 5

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

Lower 1978< -.117 2007< -.050 1989> -.045 2003< -.028 2006> -.018 2011> -.008 Higher 2015 .292 1995 .017

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

1989 +3.3 SD

10\_109A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1978 48 110

1980 151 174 211 256 211 242 318 469 503 654

1990 498 391 372 413 381 482 461 352 423 390

2000 322 282 318 247 288 306 265 201 212 236

2010 263 230 290 246 267 83

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

10\_109B 1982 to 2015 34 years Series 6

[B] Entire series, effect on correlation ( .732) is:

Lower 1986< -.043 2006> -.020 2010< -.016 1984> -.016 1989> -.010 2009< -.009 Higher 2015 .264 2012 .012

10\_109B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1982 142 143 227 218 156 392 459 440

1990 450 446 449 531 460 455 485 411 480 419

2000 359 318 297 284 343 388 320 301 260 237

2010 220 212 328 272 253 80

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

10\_115A 1946 to 2015 70 years Series 7

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

Lower 1957< -.054 1972< -.032 1969< -.024 1970> -.010 1962> -.009 1998< -.008 Higher 2015 .072 2006 .018

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

1957 -2.040 13 1

10\_115A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 227 272 241 191

1950 167 153 163 130 169 163 159 0 111 90

1960 204 260 436 375 252 107 288 321 431 158

1970 361 461 169 568 413 340 377 416 389 345

1980 392 278 347 339 306 346 439 471 506 424

1990 385 367 356 411 359 474 447 367 325 292

2000 284 275 292 366 369 455 263 405 356 327

2010 378 260 295 283 349 119

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

10\_115B 1937 to 2015 79 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

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

1937 1986 0 .08 .13 -.23 .09 .11 .02 .05 -.06 .03 -.16 .28\* .20 .06 .08 -.09 -.21 -.15 -.07 .08 .19 -.05

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

Lower 1981< -.057 1941< -.040 1970> -.014 1940< -.010 1997> -.010 1951> -.010 Higher 2015 .048 2006 .044

1937 to 1986 segment:

Lower 1941< -.071 1970> -.028 1940< -.019 1951> -.016 1975> -.012 1976> -.009 Higher 1960 .035 1950 .025

10\_115B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1937 208 181 190

1940 138 78 95 93 72 123 115 85 80 93

1950 59 121 120 108 92 72 69 39 23 46

1960 245 201 195 171 136 155 150 185 175 291

1970 345 364 382 352 266 283 326 261 288 271

1980 270 154 225 250 217 192 231 247 220 176

1990 157 159 120 146 112 174 247 250 191 199

2000 165 141 140 148 155 172 91 126 120 138

2010 174 115 172 223 199 62

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

10\_116A 1904 to 2015 112 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

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

1904 1953 7 - - - - - - - - .00 .11 .20|-.03 -.10 .17 .14 .25 .20 .33\*-.12 -.03 .05

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

1950 1999 0 .12 -.11 -.21 -.04 -.13 .08 -.16 .00 -.05 -.14 .30\*-.13 .18 -.07 -.11 .11 -.04 .26 -.04 .04 -.04

[B] Entire series, effect on correlation ( .359) is:

Lower 1994< -.030 1919< -.024 1908> -.021 1959> -.020 1987< -.018 1905< -.014 Higher 2015 .059 1961 .012

1904 to 1953 segment:

Lower 1905< -.030 1904< -.017 1910< -.010 1925> -.009 1908> -.008 1918> -.008 Higher 1939 .018 1921 .016

1950 to 1999 segment:

Lower 1959> -.069 1987< -.056 1994< -.044 1950> -.018 1988< -.008 1963< -.008 Higher 1961 .047 1960 .033

10\_116A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1904 106 99 90 106 92 78

1910 69 71 69 90 97 77 88 133 130 52

1920 69 71 51 38 26 37 26 24 15 9

1930 8 7 6 7 8 8 15 11 11 12

1940 13 14 13 9 11 12 20 21 16 21

1950 25 11 17 23 19 18 13 22 19 181

1960 330 445 338 281 221 196 179 285 186 173

1970 161 218 189 254 228 197 240 171 244 246

1980 255 174 233 259 186 227 237 168 187 180

1990 279 254 211 277 116 208 151 161 182 164

2000 149 106 132 140 108 126 84 126 123 183

2010 209 131 190 137 141 61

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

10\_116B 1975 to 2015 41 years Series 10

[B] Entire series, effect on correlation ( .477) is:

Lower 1990< -.108 1988< -.024 2010< -.016 2007< -.014 1981> -.013 2000> -.011 Higher 2015 .163 2006 .031

10\_116B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1975 231 389 320 429 489

1980 478 415 459 378 344 287 332 373 281 273

1990 185 453 383 275 213 449 425 331 403 352

2000 461 302 324 378 350 347 241 265 279 318

2010 244 229 264 250 319 123

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

10\_117A 1946 to 2015 70 years Series 11

[B] Entire series, effect on correlation ( .735) is:

Lower 2004< -.034 1978< -.022 1947< -.020 2005< -.019 2003> -.013 1989> -.012 Higher 2015 .171 2001 .014

10\_117A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 82 32 18 27

1950 16 27 33 33 28 32 11 24 43 37

1960 147 278 238 224 143 152 145 149 147 122

1970 117 129 115 142 120 99 91 101 63 87

1980 79 90 96 79 85 72 166 358 514 549

1990 407 607 467 523 471 457 444 294 416 384

2000 401 281 307 435 307 279 232 339 377 346

2010 372 269 354 342 426 160

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10\_117B 1946 to 2015 70 years Series 12

[B] Entire series, effect on correlation ( .763) is:

Lower 1989> -.023 2008< -.020 1948< -.015 1997< -.011 2003> -.009 1969< -.008 Higher 2015 .095 2006 .019

10\_117B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 107 81 35 49

1950 19 46 75 59 52 62 22 51 102 69

1960 138 255 166 191 139 113 144 185 160 106

1970 87 111 97 126 96 101 81 76 78 87

1980 84 65 72 63 59 59 114 421 545 645

1990 386 453 351 343 343 360 378 251 298 298

2000 288 224 290 325 275 270 188 214 161 180

2010 225 169 243 220 280 107

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

10\_118A 1952 to 2015 64 years Series 13

[B] Entire series, effect on correlation ( .770) is:

Lower 1989> -.027 1978< -.012 2011< -.009 2003> -.008 1957> -.007 1953< -.007 Higher 2015 .074 2006 .019

10\_118A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1952 123 84 124 128 95 157 174 153

1960 328 430 407 450 381 428 351 374 353 274

1970 198 316 226 290 203 176 173 139 120 154

1980 148 89 99 115 79 72 90 148 221 277

1990 297 243 224 263 187 237 203 229 215 224

2000 225 180 195 244 213 237 157 337 243 279

2010 290 167 289 254 319 110

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

10\_118B 1946 to 2015 70 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

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

1946 1995 -2 -.11 -.14 .02 -.12 -.06 -.08 -.09 .03 .25\* .04 .21|-.17 -.08 -.11 .02 .13 .02 .20 -.05 .03 .05

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

Lower 1946< -.222 1989> -.020 1978< -.010 1964> -.007 1965> -.006 2003> -.005 Higher 2015 .065 2006 .039

1946 to 1995 segment:

Lower 1946< -.356 1989> -.031 1978< -.015 1964> -.012 1965> -.009 1949> -.006 Higher 1961 .065 1959 .062

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

1946 1947 4.6 SD

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

1946 -5.6 SD

10\_118B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 -230 183 138 169

1950 125 155 169 204 219 234 219 210 189 134

1960 256 477 368 396 357 384 393 402 340 319

1970 224 269 215 311 201 197 177 150 151 201

1980 212 174 178 187 192 190 244 268 300 371

1990 368 317 309 401 306 417 350 311 334 316

2000 289 270 302 388 357 407 245 287 295 357

2010 436 237 363 348 391 153

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

10\_119A 1902 to 2015 114 years Series 15

[\*] Early part of series cannot be checked from 1902 to 1903 -- not matched by another series

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

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

1904 1953 -2 - - - - - - - - .13\* .09 -.11| .05 -.04 .10 .11 -.02 -.02 -.05 -.13 -.22 -.14

1925 1974 -3 -.07 -.19 -.15 .04 .09 -.06 .06 .28\* .25 .02 .13|-.03 .05 .20 .13 .16 .05 .19 .12 -.13 .04

1950 1999 10 .12 -.16 .00 -.03 -.17 -.11 -.08 .16 .08 -.21 .20|-.03 .02 .13 -.14 .19 -.16 -.01 .08 .05 .46\*

[B] Entire series, effect on correlation ( .276) is:

Lower 1924> -.048 1919> -.034 1967< -.021 1946< -.018 1922> -.018 1996< -.015 Higher 2015 .172 2001 .028

1904 to 1953 segment:

Lower 1924> -.083 1946< -.039 1922> -.024 1925< -.019 1933< -.016 1929> -.015 Higher 1921 .064 1908 .048

1925 to 1974 segment:

Lower 1967< -.056 1946< -.052 1929> -.038 1964> -.036 1932> -.029 1925< -.028 Higher 1973 .068 1961 .062

1950 to 1999 segment:

Lower 1967< -.067 1964> -.042 1950> -.040 1996< -.038 1991< -.030 1962< -.014 Higher 1973 .083 1961 .076

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

1924 +4.7 SD

10\_119A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1902 177 306 284 251 227 177 81 88

1910 56 14 36 9 6 7 8 5 6 5

1920 6 6 5 5 13 12 9 10 8 16

1930 15 14 39 28 25 16 22 25 27 48

1940 88 108 83 94 70 45 35 33 19 11

1950 41 16 18 21 22 18 13 9 11 20

1960 92 273 234 329 445 376 377 335 313 276

1970 271 299 281 406 368 295 265 253 242 263

1980 332 357 360 325 289 280 241 256 311 301

1990 352 295 237 265 261 277 192 149 113 152

2000 202 159 133 107 118 130 81 112 100 93

2010 80 57 64 52 60 19

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

10\_120A 1960 to 2015 56 years Series 16

[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 2009 0 .28 .11 -.10 -.21 -.22 .07 -.16 -.17 -.16 -.01 .32\*-.17 .02 .00 -.18 .14 -.01 - - - -

[B] Entire series, effect on correlation ( .430) is:

Lower 1994< -.135 1977> -.012 1963< -.012 1984> -.011 1974> -.010 1983> -.009 Higher 2015 .075 1961 .020

1960 to 2009 segment:

Lower 1994< -.075 1977> -.019 1984> -.018 1963< -.017 1974> -.017 1981> -.012 Higher 1961 .035 2005 .018

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

1994 -4.9 SD

10\_120A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1960 465 604 451 323 213 131 124 70 37 14

1970 28 28 47 125 156 117 146 250 343 223

1980 345 314 363 488 431 386 484 444 486 348

1990 326 321 272 343 114 261 186 225 188 181

2000 104 102 76 47 90 116 69 116 112 102

2010 109 69 107 82 91 23

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

10\_120B 1962 to 2015 54 years Series 17

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

Lower 1979< -.018 1997> -.017 1985> -.013 1982> -.013 1984> -.010 2000< -.009 Higher 2015 .176 2001 .008

10\_120B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1962 442 507 376 336 360 373 323 343

1970 274 210 167 199 112 130 93 98 137 69

1980 75 68 129 132 108 127 79 120 119 68

1990 77 101 106 140 84 116 124 163 158 141

2000 86 70 93 87 89 127 91 143 144 167

2010 192 119 152 126 139 42

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

10\_121A 1980 to 2015 36 years Series 18

[B] Entire series, effect on correlation ( .711) is:

Lower 1989> -.040 1982< -.038 1995< -.034 2006> -.025 2014< -.017 2001> -.014 Higher 2015 .393 2005 .006

10\_121A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1980 339 345 263 288 274 299 269 328 375 584

1990 656 648 555 532 425 314 222 211 236 224

2000 204 174 183 209 435 545 450 578 511 594

2010 609 395 390 374 332 112

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

10\_121B 1976 to 2015 40 years Series 19

[B] Entire series, effect on correlation ( .675) is:

Lower 2006> -.055 2010< -.035 1995< -.030 1994> -.020 1999< -.011 1992< -.011 Higher 2015 .368 2001 .017

10\_121B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1976 302 258 433 388

1980 302 270 208 259 236 246 279 473 519 452

1990 533 612 450 515 575 471 405 463 446 349

2000 377 290 281 455 533 540 509 570 541 501

2010 358 298 342 273 289 102

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

10\_122A 1980 to 2015 36 years Series 20

[B] Entire series, effect on correlation ( .581) is:

Lower 1982< -.070 1994> -.035 2003< -.031 2001> -.017 2009< -.014 1981> -.012 Higher 2015 .190 2006 .048

10\_122A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1980 424 423 256 289 336 315 527 510 554 449

1990 502 443 393 358 523 477 411 420 486 405

2000 386 329 301 225 225 257 176 197 249 195

2010 299 216 256 204 210 88

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

10\_122B 1975 to 2015 41 years Series 21

[B] Entire series, effect on correlation ( .536) is:

Lower 1993< -.048 2003< -.038 1981> -.028 1994> -.022 1982< -.009 1976> -.008 Higher 2015 .057 2001 .044

10\_122B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1975 231 312 278 288 260

1980 377 439 303 310 311 359 453 501 500 451

1990 580 558 542 344 558 541 501 437 445 476

2000 464 250 288 225 347 374 250 346 260 244

2010 284 241 327 308 298 94

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

10\_123A 1962 to 2015 54 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

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

1962 2011 0 .02 .14 .06 .24 -.04 .20 -.01 -.33 .05 -.43 .30\*-.07 -.16 .11 -.11 - - - - - -

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

Lower 1988< -.054 2006> -.037 2014< -.031 1981> -.027 1964< -.022 1977> -.012 Higher 2015 .166 2001 .027

1962 to 2011 segment:

Lower 1988< -.077 2006> -.059 1981> -.039 1977> -.017 1984> -.015 2011> -.012 Higher 2001 .057 1995 .041

10\_123A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1962 175 255 148 194 242 355 302 328

1970 270 289 277 342 272 266 273 343 334 317

1980 341 399 384 401 337 279 253 295 199 155

1990 188 190 240 217 199 303 202 207 187 183

2000 239 169 200 156 217 228 205 289 204 179

2010 150 146 158 140 82 30

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

10\_123B 1962 to 2015 54 years Series 23

[B] Entire series, effect on correlation ( .388) is:

Lower 1970< -.090 1969> -.021 1989> -.015 2011> -.013 1987< -.010 1986< -.009 Higher 1995 .024 1973 .018

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

1969 +3.5 SD

10\_123B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1962 57 115 45 65 180 233 223 520

1970 179 216 213 295 271 224 276 255 242 241

1980 244 224 234 233 200 218 186 204 305 338

1990 364 312 315 281 254 359 281 247 240 163

2000 135 109 111 120 98 111 90 82 61 75

2010 87 75 81 61 51 20

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

10\_124A 1972 to 2015 44 years Series 24

[B] Entire series, effect on correlation ( .742) is:

Lower 2006> -.023 2004< -.022 1994> -.021 1986< -.020 2011> -.012 2009< -.011 Higher 2015 .178 1973 .012

10\_124A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1972 257 293 179 141 152 97 112 155

1980 192 151 195 174 131 151 105 412 595 423

1990 338 335 283 261 368 380 316 276 270 253

2000 274 206 227 284 243 251 230 272 233 191

2010 190 201 245 216 221 84

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

10\_124B 1965 to 2015 51 years Series 25

[B] Entire series, effect on correlation ( .655) is:

Lower 2006> -.032 1998< -.030 2001> -.023 1986< -.019 2003> -.018 1989> -.012 Higher 2015 .211 1973 .015

10\_124B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1965 71 99 172 222 135

1970 79 312 285 344 173 155 200 137 210 166

1980 249 150 224 192 151 173 133 385 501 368

1990 314 283 308 252 306 299 237 226 212 218

2000 293 256 238 301 246 243 229 297 218 215

2010 204 148 211 208 205 79

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

10\_125A 1932 to 2015 84 years Series 26

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

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1932 1981 -1 -.18 -.30 -.08 -.12 .23 .01 .07 -.03 .30 .42\* .35| .33 -.01 .14 .08 .22 .08 -.10 .05 -.07 .02

1950 1999 0 -.11 -.27 -.11 -.07 .07 .16 -.03 -.13 .15 .05 .31\* .19 -.13 .06 -.04 .29 -.14 -.08 .06 -.21 .13

[B] Entire series, effect on correlation ( .573) is:

Lower 1976< -.046 1989< -.028 1932< -.020 1986< -.017 1994> -.012 1996< -.009 Higher 2015 .090 2006 .032

1932 to 1981 segment:

Lower 1976< -.086 1932< -.043 1977> -.022 1975> -.014 1945< -.012 1980< -.010 Higher 1973 .034 1963 .027

1950 to 1999 segment:

Lower 1976< -.054 1994> -.023 1986< -.022 1977> -.016 1996< -.013 1975> -.013 Higher 1973 .037 1963 .035

10\_125A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1932 38 68 44 53 72 55 53 73

1940 79 85 78 73 54 33 31 40 24 16

1950 13 5 16 10 7 6 28 19 53 84

1960 209 302 335 700 404 374 385 318 417 337

1970 314 288 397 420 315 312 213 286 276 285

1980 233 213 213 199 189 235 173 214 279 171

1990 209 277 281 285 307 286 209 223 292 274

2000 300 218 276 297 366 372 215 324 290 332

2010 398 245 354 308 318 99

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10\_125B 1966 to 2015 50 years Series 27

[B] Entire series, effect on correlation ( .482) is:

Lower 1990< -.048 1987< -.033 2001> -.031 1980< -.025 1966< -.017 1997> -.008 Higher 2015 .069 2006 .068

10\_125B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1966 353 443 627 566

1970 462 533 476 515 434 385 340 364 419 356

1980 290 331 337 296 278 314 382 247 342 256

1990 219 371 318 275 237 299 304 320 304 303

2000 291 285 294 266 305 291 171 269 226 257

2010 288 207 302 243 238 89

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

10\_126A 1987 to 2015 29 years Series 28

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

Lower 1991< -.201 2006> -.054 1987< -.025 2011> -.014 2005< -.010 2003< -.009 Higher 2015 .262 2001 .022

10\_126A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1987 475 591 524

1990 545 394 521 597 513 641 508 545 675 494

2000 526 424 433 400 560 446 509 534 446 543

2010 627 428 479 358 321 72

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10\_126B 1981 to 2015 35 years Series 29

[B] Entire series, effect on correlation ( .692) is:

Lower 2006> -.076 1981> -.024 1991< -.018 1983< -.018 2011> -.014 2007< -.013 Higher 2015 .274 2001 .028

10\_126B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1981 307 282 177 127 211 344 395 486 475

1990 569 388 461 581 507 603 535 441 565 452

2000 459 327 389 407 569 538 531 419 340 483

2010 501 422 368 269 331 82

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10\_129A 1977 to 2015 39 years Series 30

[B] Entire series, effect on correlation ( .551) is:

Lower 2015> -.071 1990< -.032 1978< -.013 1997> -.012 1991< -.011 1983> -.011 Higher 2006 .057 1995 .021

10\_129A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1977 217 207 228

1980 252 224 233 256 158 199 207 195 170 112

1990 98 108 145 142 143 241 184 201 205 152

2000 114 108 125 112 133 176 64 129 107 151

2010 197 77 113 99 177 68

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10\_129B 1964 to 2015 52 years Series 31

[B] Entire series, effect on correlation ( .573) is:

Lower 1970> -.049 1971< -.027 1990< -.020 1981> -.018 1968< -.017 1975> -.012 Higher 2015 .049 2006 .046

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

1970 +3.2 SD

10\_129B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1964 56 94 143 107 85 173

1970 376 126 140 278 171 274 281 287 326 334

1980 371 336 219 264 231 279 239 330 332 208

1990 197 282 246 238 255 344 344 314 310 229

2000 217 172 190 250 273 312 134 277 256 256

2010 337 212 257 254 324 106

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10\_131A 1916 to 2015 100 years Series 32

[B] Entire series, effect on correlation ( .606) is:

Lower 1989< -.026 1964> -.017 1924< -.016 1966< -.016 1988< -.015 1939< -.007 Higher 2015 .050 2006 .027

10\_131A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 123 202 171 81

1920 84 134 100 76 31 51 26 47 33 31

1930 22 23 33 34 36 57 56 60 65 54

1940 75 85 78 75 47 74 97 91 66 82

1950 45 69 77 94 82 80 81 53 109 59

1960 170 210 133 205 296 321 129 134 133 178

1970 249 434 432 464 318 219 256 184 246 207

1980 263 230 262 238 217 227 211 239 165 102

1990 119 139 120 109 103 168 137 102 137 147

2000 154 105 105 73 93 129 63 95 97 105

2010 134 74 118 96 109 32

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10\_131B 1917 to 2015 99 years Series 33

[B] Entire series, effect on correlation ( .549) is:

Lower 1919> -.030 1939< -.029 1926> -.027 1918< -.019 1922< -.019 1974> -.015 Higher 2015 .142 1921 .015

10\_131B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1917 36 27 32

1920 39 71 37 48 28 39 51 68 57 32

1930 25 14 33 49 43 46 47 47 47 34

1940 58 78 65 59 51 60 58 57 47 63

1950 29 43 58 66 64 64 55 57 151 74

1960 201 224 144 214 132 141 132 210 200 193

1970 180 279 330 356 379 226 242 222 277 203

1980 241 173 289 323 252 220 244 258 193 122

1990 132 155 142 116 135 196 212 173 211 143

2000 119 103 126 81 132 151 107 145 147 148

2010 133 111 129 101 132 40

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10\_159A 1968 to 2015 48 years Series 34

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

Lower 1989< -.060 1974> -.038 1988< -.024 1968< -.021 1973< -.013 1987< -.013 Higher 2015 .111 1995 .024

10\_159A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1968 395 438

1970 466 455 545 469 631 477 482 474 517 391

1980 356 319 418 322 241 293 281 238 209 148

1990 198 207 224 176 182 249 192 190 175 222

2000 211 144 119 120 171 185 129 168 131 166

2010 202 147 212 208 218 61

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

10\_167A 1980 to 2015 36 years Series 35

[B] Entire series, effect on correlation ( .803) is:

Lower 2009< -.030 2003> -.025 1981> -.016 1991> -.014 1982< -.013 2007< -.009 Higher 2015 .202 2001 .014

10\_167A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1980 340 380 267 270 220 255 298 464 750 676

1990 710 858 795 742 680 651 563 517 493 470

2000 501 396 409 528 447 479 340 316 273 212

2010 295 212 324 269 234 60

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10\_167B 1974 to 2015 42 years Series 36

[B] Entire series, effect on correlation ( .690) is:

Lower 2005< -.042 2006> -.027 1981> -.026 1989> -.016 1986< -.012 2008< -.012 Higher 2015 .291 2001 .022

10\_167B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1974 219 222 287 273 602 596

1980 351 427 255 193 226 217 189 282 578 679

1990 706 716 587 477 462 480 518 493 476 424

2000 376 328 363 430 391 319 303 370 306 287

2010 295 225 302 270 243 91

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10\_218A 1982 to 2015 34 years Series 37

[B] Entire series, effect on correlation ( .573) is:

Lower 2006> -.083 1983< -.045 2005< -.039 2007< -.035 2011> -.018 1994> -.014 Higher 2015 .296 2001 .039

10\_218A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1982 700 524 729 822 872 769 1074 524

1990 969 586 597 912 819 1016 814 536 643 528

2000 617 422 588 598 662 440 717 409 601 819

2010 693 544 501 462 582 100

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10\_218B 1981 to 2015 35 years Series 38

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

Lower 2006> -.139 1997< -.051 1995< -.040 2011> -.018 1994> -.017 2007< -.015 Higher 2015 .428 2001 .023

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

2006 +3.7 SD

10\_218B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1981 701 628 668 699 525 791 917 779 601

1990 751 528 583 521 578 382 393 193 248 220

2000 241 189 300 280 295 329 531 335 274 342

2010 349 352 405 289 352 67

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10\_119B 1960 to 2015 56 years Series 39

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

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1960 2009 0 .13 .07 -.31 .00 .06 .03 -.03 -.32 -.02 -.17 .30\* .04 .05 .10 .00 .28 -.09 - - - -

1966 2015 -5 .15 -.07 -.31 -.01 -.02 .20\*-.12 -.20 .06 -.30 .14| - - - - - - - - - -

[B] Entire series, effect on correlation ( .120) is:

Lower 2015> -.244 1960< -.043 1963< -.015 1998< -.012 2001> -.011 1989> -.008 Higher 1973 .031 2006 .030

1960 to 2009 segment:

Lower 1960< -.076 2001> -.042 1963< -.026 1998< -.019 1989> -.017 1982> -.015 Higher 1973 .039 1961 .033

1966 to 2015 segment:

Lower 2015> -.289 1998< -.015 2001> -.012 1996< -.010 1989> -.007 1999< -.006 Higher 1973 .034 2006 .032

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

2014 2015 5.2 SD

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

2015 +4.8 SD

10\_119B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1960 306 403 411 345 311 316 360 406 343 347

1970 332 347 339 381 281 256 240 260 323 311

1980 292 235 291 272 247 244 244 265 268 239

1990 225 172 151 125 136 131 82 61 54 40

2000 63 61 57 35 47 52 31 42 42 36

2010 39 17 32 19 22 38

PART 7: DESCRIPTIVE STATISTICS: HHSG01G10\_TSCA\_corr1-50 11:15 Mon 27 Nov 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 10\_101A 1962 2015 54 2 0 .559 2.50 6.19 1.287 .769 .290 2.77 .531 .058 1

2 10\_101B 1966 2015 50 1 0 .717 1.94 3.22 .656 .645 .210 2.67 .493 -.023 3

3 10\_108A 1939 2015 77 3 0 .673 1.89 4.50 1.385 .933 .235 2.55 .376 -.080 1

4 10\_108B 1927 2015 89 3 0 .686 1.15 3.81 .913 .914 .295 2.68 .418 -.086 1

5 10\_109A 1978 2015 38 1 0 .567 3.04 6.54 1.268 .818 .210 2.68 .547 -.081 1

6 10\_109B 1982 2015 34 1 0 .732 3.30 5.30 1.171 .797 .176 2.53 .490 .074 1

7 10\_115A 1946 2015 70 3 0 .595 3.09 5.68 1.145 .545 .303 2.52 .408 -.051 1

8 10\_115B 1937 2015 79 3 1 .446 1.72 3.82 .797 .818 .232 2.54 .366 -.021 1

9 10\_116A 1904 2015 112 4 2 .359 1.20 4.45 .954 .879 .253 2.58 .371 -.134 2

10 10\_116B 1975 2015 41 1 0 .477 3.33 4.89 .862 .348 .226 2.53 .572 -.024 1

11 10\_117A 1946 2015 70 3 0 .735 2.15 6.07 1.635 .890 .275 2.64 .370 -.126 1

12 10\_117B 1946 2015 70 3 0 .763 1.80 6.45 1.315 .855 .292 2.76 .455 -.133 1

13 10\_118A 1952 2015 64 2 0 .770 2.22 4.50 .952 .747 .241 2.74 .503 -.096 2

14 10\_118B 1946 2015 70 3 1 .453 2.68 4.77 1.076 .622 .209 2.64 .433 -.089 1

15 10\_119A 1902 2015 114 4 3 .276 1.38 4.45 1.283 .950 .285 2.78 .446 -.016 4

16 10\_120A 1960 2015 56 2 1 .430 2.11 6.04 1.520 .874 .342 2.34 .362 -.068 2

17 10\_120B 1962 2015 54 2 0 .714 1.60 5.07 1.043 .910 .246 2.60 .454 -.030 1

18 10\_121A 1980 2015 36 1 0 .711 3.74 6.56 1.522 .805 .185 2.43 .414 .124 1

19 10\_121B 1976 2015 40 1 0 .675 3.93 6.12 1.233 .738 .191 2.52 .422 .028 1

20 10\_122A 1980 2015 36 1 0 .581 3.42 5.54 1.210 .789 .193 2.64 .650 -.001 1

21 10\_122B 1975 2015 41 1 0 .536 3.65 5.80 1.152 .668 .199 2.42 .556 -.012 1

22 10\_123A 1962 2015 54 2 1 .441 2.39 4.01 .794 .766 .197 2.74 .548 .046 1

23 10\_123B 1962 2015 54 2 0 .388 1.93 5.20 1.025 .725 .228 2.86 .395 -.129 1

24 10\_124A 1972 2015 44 1 0 .742 2.40 5.95 .982 .685 .218 2.53 .483 -.070 2

25 10\_124B 1965 2015 51 2 0 .655 2.26 5.01 .825 .517 .274 2.66 .473 -.033 1

26 10\_125A 1932 2015 84 3 2 .573 2.09 7.00 1.392 .841 .277 2.69 .512 -.129 1

27 10\_125B 1966 2015 50 1 0 .482 3.26 6.27 1.002 .744 .183 2.46 .494 -.043 1

28 10\_126A 1987 2015 29 1 0 .503 4.87 6.75 1.152 .399 .218 2.51 .539 .015 1

29 10\_126B 1981 2015 35 1 0 .692 4.10 6.03 1.309 .677 .238 2.40 .502 .043 1

30 10\_129A 1977 2015 39 1 0 .551 1.60 2.56 .533 .538 .260 2.61 .548 -.040 1

31 10\_129B 1964 2015 52 2 0 .573 2.43 3.75 .798 .381 .271 2.72 .506 -.040 1

32 10\_131A 1916 2015 100 4 0 .606 1.31 4.64 .902 .849 .281 2.53 .509 -.052 1

33 10\_131B 1917 2015 99 4 0 .549 1.27 3.79 .860 .873 .261 2.61 .418 -.051 1

34 10\_159A 1968 2015 48 1 0 .401 2.74 6.30 1.375 .894 .195 2.62 .466 .080 1

35 10\_167A 1980 2015 36 1 0 .803 4.36 8.58 1.958 .883 .201 2.49 .465 -.032 1

36 10\_167B 1974 2015 42 1 0 .690 3.77 7.16 1.529 .770 .195 2.61 .442 .009 2

37 10\_218A 1982 2015 34 1 0 .573 6.53 10.74 1.972 .209 .306 2.55 .572 -.072 1

38 10\_218B 1981 2015 35 1 0 .489 4.47 9.17 2.063 .801 .243 2.65 .519 -.088 1

39 10\_119B 1960 2015 56 2 2 .120 1.97 4.11 1.307 .968 .182 2.63 .565 .084 1

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Total or mean: 2237 76 13 .557 2.38 10.74 1.149 .770 .247 2.86 .464 -.044

- = [ COFECHA HHS COF ] = -