[] Dendrochronology Program Library Run ACRU Program COF 12:45 Thu 20 Apr 2017 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30062

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: ACRU\_WLWO\_Corr2-50

File of DATED series: ACRU\_WLWO\_Corr2

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 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 1847 to 2016 170 years

Continuous time span is 1847 to 2016 170 years

Portion with two or more series is 1849 to 2016 168 years

>> 1729A 2014 absent in 2 of 29 series, but is not usually narrow: master index is .028

>> 1729A 2015 absent in 4 of 29 series, but is not usually narrow: master index is .282

>> 1729B 2014 absent in 2 of 29 series, but is not usually narrow: master index is .028

>> 1729B 2015 absent in 4 of 29 series, but is not usually narrow: master index is .282

>> 1731A 2015 absent in 4 of 29 series, but is not usually narrow: master index is .282

>> 1733A 2015 absent in 4 of 29 series, but is not usually narrow: master index is .282

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

\*C\* Number of dated series 29 \*C\*

\*O\* Master series 1847 2016 170 yrs \*O\*

\*F\* Total rings in all series 3983 \*F\*

\*E\* Total dated rings checked 3981 \*E\*

\*C\* Series intercorrelation .599 \*C\*

\*H\* Average mean sensitivity .302 \*H\*

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

\*\*\* Mean length of series 137.3 \*\*\*

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

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

1729A 3 absent rings: 2014 2015 2016

1729B 3 absent rings: 2014 2015 2016

1731A 2 absent rings: 2015 2016

1733A 3 absent rings: 2001 2015 2016

11 absent rings .276%

1850 .536 3 1900 -1.474 26 1950 -2.025 29 2000 .604 29

1851 1.179 3 1901 .465 26 1951 .456 29 2001 -.418 29 1

1852 -.106 3 1902 .993 27 1952 -.115 29 2002 .549 29

1853 1.887 3 1903 .413 27 1953 -.997 29 2003 -.261 29

1854 .216 3 1904 .965 27 1954 1.326 29 2004 .194 29

1855 -1.234 4 1905 1.223 27 1955 .827 29 2005 .320 29

1856 -.582 4 1906 .787 27 1956 .093 29 2006 .426 29

1857 1.207 4 1907 -.181 27 1957 1.544 29 2007 .140 29

1858 .725 5 1908 -1.133 27 1958 1.003 29 2008 .207 29

1859 -.668 5 1909 -.641 27 1959 .382 29 2009 1.420 29

1860 -1.304 6 1910 .431 27 1960 .384 29 2010 .216 29

1861 .662 7 1911 -1.049 27 1961 1.886 29 2011 .003 29

1862 .322 7 1912 .465 27 1962 .244 29 2012 -.351 29

1863 1.137 9 1913 -.662 27 1963 -1.231 29 2013 .594 29

1864 -2.306 9 1914 -.295 27 1964 .373 29 2014 .028 29 2<<

1865 .569 9 1915 .701 27 1965 -.733 29 2015 .282 29 4<<

1866 .326 10 1916 1.157 27 1966 -1.270 29 2016 -1.163 29 4

1867 -.563 10 1917 -.993 27 1967 .084 29

1868 -.477 10 1918 .363 27 1968 -.601 29

1869 .912 10 1919 -1.610 27 1969 .450 29

1870 -.154 10 1920 .364 27 1970 -1.336 29

1871 -.823 10 1921 -.203 27 1971 -1.522 29

1872 .069 10 1922 -.567 27 1972 .188 29

1873 -1.625 10 1923 -1.822 27 1973 .608 29

1874 .243 10 1924 .034 27 1974 .478 29

1875 .972 10 1925 .398 27 1975 -2.495 29

1876 -.344 10 1926 1.270 27 1976 1.537 29

1877 1.030 11 1927 .989 29 1977 -.857 29

1878 -.326 11 1928 -.520 29 1978 .435 29

1879 .025 12 1929 .872 29 1979 -.644 29

1880 -.404 14 1930 .382 29 1980 .947 29

1881 1.801 14 1931 .479 29 1981 .255 29

1882 -.368 15 1932 1.178 29 1982 .278 29

1883 1.576 16 1933 -1.682 29 1983 .149 29

1884 -.807 18 1934 .022 29 1984 1.145 29

1885 .338 19 1935 .791 29 1985 -.485 29

1886 .332 19 1936 -.237 29 1986 1.720 29

1887 .002 19 1937 .040 29 1987 -.224 29

1888 -.096 21 1938 -.209 29 1988 -2.308 29

1889 1.530 21 1939 -.195 29 1989 .991 29

1890 -2.431 22 1940 .509 29 1990 1.275 29

1891 .157 23 1941 -1.403 29 1991 -.516 29

1892 1.595 23 1942 .606 29 1992 .612 29

1893 -.970 23 1943 1.224 29 1993 -.425 29

1894 .114 23 1944 -.129 29 1994 1.040 29

1895 -.478 23 1945 .672 29 1995 -2.739 29

1896 .762 23 1946 -1.010 29 1996 .133 29

1847 -1.424 1 1897 .928 26 1947 .926 29 1997 -1.178 29

1848 1.955 1 1898 -.820 26 1948 -1.622 29 1998 -.123 29

1849 -1.191 2 1899 -1.965 26 1949 -2.182 29 1999 -2.354 29

PART 5: CORRELATION OF SERIES BY SEGMENTS: ACRU\_WLWO\_Corr2-50 12:45 Thu 20 Apr 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 1825 1850 1875 1900 1925 1950 1975

1874 1899 1924 1949 1974 1999 2024

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

1 1726A 1861 2016 .68 .64 .71 .81 .85 .74

2 1726B 1890 2016 .62 .68 .76 .88 .79

3 1727A 1877 2016 .61 .69 .78 .84 .71

4 1727B 1888 2016 .70 .63 .72 .76 .73

5 1728A 1880 2016 .64 .45 .51 .68 .63

6 1728B 1883 2016 .67 .65 .73 .71 .62

7 1729A 1879 2016 .77 .67 .51 .68 .68

8 1729B 1891 2016 .74 .74 .62 .73 .67

9 1730A 1863 2016 .66 .68 .62 .59 .79 .76

10 1730B 1902 2016 .56 .60 .77 .79

11 1731A 1855 2016 .63 .68 .36B .44 .76 .71

12 1731B 1863 2016 .61 .61 .51 .68 .73 .65

13 1732A 1860 2016 .38 .57 .53 .61 .70 .68

14 1732B 1847 2016 .48 .50 .58 .50 .58 .71 .60

15 1733A 1850 2016 .49 .74 .50 .54 .34 .21A

16 1733B 1849 2016 .70 .65 .65 .50 .36 .47 .40

17 1735A 1880 2016 .66 .66 .63 .64 .42

18 1735B 1882 2016 .38 .42 .63 .61 .47

19 1736A 1888 2016 .55 .58 .53 .48 .41

20 1736B 1884 2016 .58 .50 .51 .47 .43

21 1738A 1866 2016 .56 .60 .54 .45 .54 .48

22 1738B 1858 2016 .64 .64 .61 .48 .57 .58

23 1739A 1927 2016 .49 .74 .67

24 1739B 1927 2016 .63 .76 .68

25 1740A 1897 2016 .37 .48 .75 .85 .80

26 1740B 1897 2016 .37 .45 .63 .69 .56

27 1740C 1897 2016 .37 .49 .75 .87 .80

28 1741A 1884 2016 .68 .78 .75 .61 .44

29 1741B 1885 2016 .52 .68 .77 .73 .59

Av segment correlation .59 .58 .60 .57 .61 .69 .61

PART 6: POTENTIAL PROBLEMS: ACRU\_WLWO\_Corr2-50 12:45 Thu 20 Apr 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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1726A 1861 to 2016 156 years Series 1

[B] Entire series, effect on correlation ( .720) is:

Lower 1913< -.031 1871> -.017 2012< -.015 1875< -.013 1971> -.007 1976< -.006 Higher 1890 .016 1864 .014

1726A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1861 109 110 143 67 108 106 80 94 167

1870 109 158 156 136 155 108 102 130 126 122

1880 116 157 112 190 156 227 188 185 189 266

1890 117 207 240 171 172 139 186 168 163 135

1900 139 164 213 225 261 210 155 160 113 157

1910 156 121 142 68 105 147 122 103 104 97

1920 124 105 105 85 136 137 180 167 135 239

1930 223 257 227 128 171 231 179 155 164 149

1940 205 100 201 232 191 217 154 275 160 113

1950 121 165 117 81 212 183 139 237 231 231

1960 226 273 218 117 189 153 126 140 111 193

1970 124 177 215 241 228 121 172 107 162 142

1980 182 159 200 194 282 161 264 155 83 177

1990 136 102 166 94 167 59 130 85 125 78

2000 170 149 162 185 154 163 136 224 184 225

2010 168 154 80 122 104 115 111

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

1726B 1890 to 2016 127 years Series 2

[B] Entire series, effect on correlation ( .715) is:

Lower 1913< -.021 1890> -.017 1948> -.012 2010> -.010 2016> -.009 1938> -.006 Higher 1995 .017 1988 .013

1726B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1890 130 265 299 107 151 129 183 152 127 123

1900 100 154 199 253 292 205 141 153 96 124

1910 153 130 178 81 130 162 130 119 129 84

1920 147 179 152 98 144 140 165 205 133 202

1930 177 215 176 126 162 189 135 132 214 167

1940 189 113 164 204 170 205 138 239 168 86

1950 86 140 117 93 226 203 128 225 214 220

1960 212 256 215 113 146 143 106 123 101 164

1970 128 142 204 205 221 112 205 146 192 175

1980 309 171 203 205 251 140 246 163 82 184

1990 146 92 154 101 138 57 129 74 78 62

2000 127 72 123 105 80 106 92 79 92 147

2010 179 112 62 80 82 71 99

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1727A 1877 to 2016 140 years Series 3

[B] Entire series, effect on correlation ( .695) is:

Lower 1880< -.022 2003< -.016 2014< -.015 1884> -.008 1908> -.007 1911> -.006 Higher 1995 .027 1899 .009

1727A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1877 132 190 119

1880 55 231 153 197 178 185 185 175 163 198

1890 98 153 201 97 108 114 136 154 99 65

1900 83 147 155 141 166 218 200 178 152 121

1910 133 137 114 91 109 137 156 109 146 108

1920 118 107 87 88 106 112 164 184 132 163

1930 149 174 238 159 200 321 207 229 239 193

1940 222 128 161 220 157 224 136 191 113 105

1950 89 201 182 107 260 216 262 332 281 227

1960 239 398 369 211 272 199 203 313 293 290

1970 234 189 302 404 349 202 297 236 271 256

1980 322 309 282 217 321 237 358 260 158 224

1990 280 196 210 158 214 78 151 178 247 126

2000 226 229 216 107 213 254 294 202 169 246

2010 253 251 259 258 187 308 250

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1727B 1888 to 2016 129 years Series 4

[B] Entire series, effect on correlation ( .721) is:

Lower 1975> -.023 1980< -.021 1921< -.011 1925< -.011 1983< -.010 1962< -.007 Higher 1995 .026 1988 .015

1727B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1888 177 177

1890 90 129 173 96 121 115 153 165 96 64

1900 91 168 193 149 217 218 189 157 125 105

1910 115 112 167 77 103 102 160 92 127 94

1920 118 74 105 92 94 83 114 126 88 144

1930 151 180 175 129 155 199 142 156 111 138

1940 134 97 147 180 191 191 115 161 135 114

1950 111 229 208 163 264 220 186 233 185 163

1960 167 200 122 127 162 123 119 144 117 132

1970 113 108 171 197 210 171 246 185 187 166

1980 126 168 171 127 209 168 222 188 114 206

1990 269 198 221 173 233 116 179 182 193 125

2000 192 218 219 164 264 283 290 330 350 377

2010 297 225 224 279 240 337 245

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1728A 1880 to 2016 137 years Series 5

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

Lower 1913> -.016 1938> -.011 1903< -.010 1953> -.009 1930< -.007 1919> -.007 Higher 1890 .033 1995 .021

1728A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1880 92 106 84 113 93 114 164 114 91 113

1890 44 119 140 93 123 96 140 129 67 76

1900 59 125 100 80 141 153 225 259 193 241

1910 288 231 342 384 340 319 300 186 263 236

1920 294 236 185 171 236 197 222 230 172 168

1930 141 136 184 127 196 240 198 168 288 221

1940 272 186 206 215 159 154 117 197 150 176

1950 194 275 311 306 370 294 225 267 241 227

1960 210 275 204 167 152 144 145 157 114 147

1970 109 167 152 320 241 206 457 259 342 186

1980 293 257 217 185 191 139 289 176 145 300

1990 343 310 306 263 276 96 98 94 160 89

2000 184 75 256 202 171 250 217 340 296 451

2010 454 353 274 255 214 204 235

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1728B 1883 to 2016 134 years Series 6

[B] Entire series, effect on correlation ( .665) is:

Lower 2004< -.026 1938> -.014 1904< -.010 1974< -.007 1907> -.007 1908> -.007 Higher 1890 .026 1995 .013

1728B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1883 112 72 83 111 95 78 95

1890 46 94 102 79 111 97 92 97 63 76

1900 74 135 178 135 126 265 339 399 345 337

1910 438 284 335 318 264 305 275 206 202 152

1920 201 194 145 149 247 217 326 286 220 287

1930 272 223 227 143 206 259 246 233 369 267

1940 323 213 250 250 189 235 180 236 163 163

1950 166 205 211 209 257 287 196 337 298 282

1960 269 382 224 151 208 184 188 207 123 213

1970 117 108 118 144 99 96 196 163 200 160

1980 231 334 336 416 384 308 463 237 177 280

1990 209 156 195 113 164 52 64 74 107 67

2000 152 75 167 93 40 74 64 140 106 231

2010 292 299 285 317 270 263 169

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1729A 1879 to 2016 138 years Series 7

[B] Entire series, effect on correlation ( .661) is:

Lower 2009< -.018 1931< -.015 1938< -.013 1958< -.011 1957< -.010 1968> -.008 Higher 1995 .019 1988 .018

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

2014 .028 29 2 >> WARNING: Ring is not usually narrow

2015 .282 29 4 >> WARNING: Ring is not usually narrow

2016 -1.163 29 4

>> WARNING: Last ring in series is ABSENT

1729A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1879 127

1880 85 210 86 239 104 156 116 100 102 201

1890 88 164 188 86 135 116 114 218 162 106

1900 126 205 336 277 252 304 333 346 201 206

1910 220 172 194 169 211 257 268 185 242 175

1920 270 283 263 211 293 294 324 312 259 315

1930 255 143 197 123 193 198 159 178 102 180

1940 247 172 271 355 197 220 153 190 116 101

1950 131 259 257 187 302 254 183 121 88 93

1960 96 134 72 80 132 92 88 149 152 116

1970 114 71 132 125 89 83 173 103 107 123

1980 222 247 247 192 196 163 269 173 62 223

1990 361 162 254 197 259 101 364 209 306 130

2000 360 206 220 157 235 173 281 88 62 37

2010 137 123 142 95 0 0 0

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1729B 1891 to 2016 126 years Series 8

[B] Entire series, effect on correlation ( .700) is:

Lower 2009< -.021 1938< -.018 1974< -.010 1971< -.009 1928> -.008 2014< -.007 Higher 1988 .019 1999 .011

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

2014 .028 29 2 >> WARNING: Ring is not usually narrow

2015 .282 29 4 >> WARNING: Ring is not usually narrow

2016 -1.163 29 4

>> WARNING: Last ring in series is ABSENT

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

1971 -4.5 SD

1729B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1891 167 248 89 139 112 156 165 138 92

1900 117 239 310 215 231 289 348 327 220 204

1910 217 148 185 139 190 265 258 152 219 125

1920 211 215 179 155 216 212 285 255 236 323

1930 258 153 190 113 171 200 158 176 93 184

1940 233 123 201 264 170 256 155 196 125 122

1950 112 181 168 126 270 274 281 233 200 181

1960 147 201 96 102 167 110 92 114 103 75

1970 69 39 82 79 62 59 111 71 103 114

1980 126 128 157 149 145 138 221 145 63 210

1990 208 148 182 151 160 86 150 74 127 59

2000 78 82 88 86 93 92 161 108 113 29

2010 35 43 42 79 0 0 0

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1730A 1863 to 2016 154 years Series 9

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

Lower 1941> -.018 1871> -.013 1867> -.012 1936< -.009 1988> -.007 1969< -.007 Higher 1864 .017 1995 .016

1730A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1863 250 160 220 238 272 214 250

1870 189 202 134 118 152 147 109 114 72 76

1880 87 146 95 106 85 72 70 56 53 86

1890 47 46 78 51 78 60 53 71 49 19

1900 42 98 119 84 153 185 119 133 103 95

1910 114 69 103 90 112 151 139 78 104 57

1920 96 93 105 90 100 114 138 109 88 154

1930 153 99 110 77 113 89 40 87 48 84

1940 158 171 189 205 136 170 107 130 69 57

1950 77 92 143 153 294 181 252 314 310 236

1960 223 328 271 133 198 152 130 172 111 109

1970 143 97 163 211 166 113 233 195 234 219

1980 247 189 198 384 409 265 533 326 273 609

1990 504 320 307 229 310 106 213 109 211 96

2000 177 151 217 140 184 125 168 190 241 385

2010 203 258 143 147 107 135 86

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1730B 1902 to 2016 115 years Series 10

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

Lower 1948> -.022 1923> -.017 1939< -.014 1931< -.012 1946> -.009 1912< -.008 Higher 1995 .024 1999 .018

1730B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1902 169 112 156 159 117 95 83 78

1910 121 81 75 74 81 74 100 54 85 57

1920 82 83 98 94 103 116 131 126 80 128

1930 99 91 136 97 147 149 144 150 153 112

1940 194 160 230 327 251 320 274 383 290 180

1950 231 331 191 159 277 209 291 333 291 246

1960 235 302 256 132 225 179 165 230 239 334

1970 195 266 315 443 360 156 483 286 318 238

1980 269 172 172 359 409 243 568 311 204 387

1990 316 225 303 236 318 140 370 239 347 141

2000 390 296 332 304 385 341 333 312 429 453

2010 221 239 187 221 123 221 106

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1731A 1855 to 2016 162 years Series 11

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

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

1900 1949 -10 .42\* .00 .33 .02 -.08 .00 -.19 -.12 .06 -.26 .36|-.11 .05 .00 .03 .15 .15 -.17 -.13 -.06 .11

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

Lower 1943< -.026 1860> -.014 1948> -.014 1931< -.009 2009< -.009 1911> -.008 Higher 1995 .017 1890 .016

1900 to 1949 segment:

Lower 1943< -.099 1948> -.049 1931< -.033 1911> -.027 1927< -.021 1913> -.014 Higher 1949 .043 1919 .036

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

2015 .282 29 4 >> WARNING: Ring is not usually narrow

2016 -1.163 29 4

>> WARNING: Last ring in series is ABSENT

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

1975 -5.3 SD

1731A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1855 56 51 71 63 79

1860 99 121 115 134 60 74 77 45 54 64

1870 46 40 65 27 46 166 165 186 118 119

1880 111 117 105 123 92 122 93 72 87 121

1890 43 65 132 60 89 92 134 82 34 15

1900 30 57 62 68 111 94 68 56 66 54

1910 117 135 215 152 150 135 124 80 106 61

1920 93 92 121 83 149 209 213 110 88 104

1930 100 62 146 99 177 118 117 116 127 106

1940 120 100 164 72 66 131 113 222 217 104

1950 105 311 177 101 175 160 196 403 368 286

1960 339 462 444 312 367 320 274 439 390 395

1970 254 316 393 496 381 120 361 204 293 360

1980 443 483 345 361 465 271 538 318 173 420

1990 411 208 247 162 350 90 373 166 134 70

2000 87 92 123 77 135 118 172 66 9 11

2010 32 96 166 230 150 0 0

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1731B 1863 to 2016 154 years Series 12

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

Lower 1864> -.013 1911> -.012 2016> -.009 1927< -.007 1913> -.007 1975< -.007 Higher 1995 .009 1899 .008

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

1975 -5.6 SD

1731B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1863 114 68 106 86 57 68 93

1870 72 63 93 39 74 140 93 150 132 125

1880 109 145 116 140 90 114 90 76 75 131

1890 57 71 121 62 96 96 138 70 46 26

1900 37 61 50 64 80 80 64 51 58 40

1910 124 117 149 121 124 85 99 64 88 72

1920 92 94 77 72 76 83 95 82 65 93

1930 138 114 190 108 224 177 174 154 134 188

1940 162 134 205 252 148 258 121 158 101 94

1950 91 228 120 149 242 218 220 329 284 225

1960 246 320 306 205 300 285 293 373 313 312

1970 228 252 334 451 354 114 333 245 297 252

1980 313 333 275 263 357 222 412 345 195 377

1990 450 240 271 212 351 106 375 188 146 93

2000 147 174 221 205 300 250 276 126 110 117

2010 84 41 46 82 128 123 113

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1732A 1860 to 2016 157 years Series 13

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

Lower 1864> -.040 1860> -.018 1861< -.013 1914< -.013 1923> -.011 1866< -.010 Higher 1975 .021 1995 .015

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

1864 +3.8 SD

1732A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1860 65 20 62 39 58 34 25 24 36 41

1870 46 16 43 23 29 69 41 56 60 78

1880 67 93 66 78 50 66 50 26 38 66

1890 19 40 70 41 64 60 87 93 37 16

1900 30 58 79 67 71 51 43 29 36 30

1910 50 35 42 43 26 56 67 61 73 63

1920 92 87 89 106 156 172 165 163 72 109

1930 62 72 69 54 73 65 55 61 51 80

1940 47 53 83 83 59 103 100 156 48 58

1950 64 66 83 115 252 368 167 281 256 222

1960 274 365 343 290 308 214 190 162 183 244

1970 175 127 214 136 159 87 163 94 151 127

1980 167 98 156 126 174 125 251 166 149 261

1990 284 179 221 128 127 67 156 81 155 72

2000 144 102 156 134 200 123 198 227 138 205

2010 168 238 220 232 150 210 102

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1732B 1847 to 2016 170 years Series 14

[\*] Early part of series cannot be checked from 1847 to 1848 -- not matched by another series

[B] Entire series, effect on correlation ( .530) is:

Lower 1855< -.037 1870> -.019 1923> -.015 1951< -.010 2008< -.010 1906< -.009 Higher 1890 .022 1988 .011

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

1870 +3.4 SD

1732B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1847 85 158 88

1850 119 112 89 118 106 30 60 82 73 43

1860 24 50 34 37 24 34 25 19 29 24

1870 83 31 42 26 34 61 36 48 60 64

1880 67 92 68 82 64 79 73 29 45 88

1890 22 32 69 45 65 69 96 99 54 33

1900 46 73 68 65 77 83 47 42 40 43

1910 62 57 49 63 46 69 73 58 58 54

1920 68 56 49 86 103 108 123 117 46 86

1930 63 98 79 49 85 73 82 71 56 54

1940 38 38 43 37 38 52 46 95 29 28

1950 33 7 50 52 178 278 221 433 468 397

1960 402 314 220 160 235 192 174 171 169 243

1970 118 82 82 89 129 115 237 160 223 159

1980 278 152 233 240 300 186 322 169 124 210

1990 181 113 247 197 267 125 197 116 146 74

2000 199 162 219 212 208 132 131 98 53 81

2010 77 112 98 121 153 213 177

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1733A 1850 to 2016 167 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

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1967 2016 0 -.34 .14 .01 -.08 -.15 .07 -.03 -.23 .04 -.02 .21\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .425) is:

Lower 1855> -.059 1986< -.040 1931< -.012 1912< -.009 1940< -.008 1999> -.008 Higher 1890 .015 1864 .014

1967 to 2016 segment:

Lower 1986< -.110 1999> -.021 1977> -.018 1996< -.015 1985> -.015 1994< -.014 Higher 1976 .045 1971 .037

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

1854 1855 4.1 SD

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

2001 -.418 29 1

2015 .282 29 4 >> WARNING: Ring is not usually narrow

2016 -1.163 29 4

>> WARNING: Last ring in series is ABSENT

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

1855 +4.8 SD

1733A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1850 196 192 142 218 135 313 127 178 140 83

1860 68 150 121 160 80 170 187 162 126 213

1870 144 91 172 140 211 154 149 175 104 128

1880 126 192 138 184 96 170 134 167 163 214

1890 104 146 306 127 179 150 265 215 121 127

1900 90 158 216 218 308 253 185 153 98 95

1910 114 87 64 56 81 95 84 71 63 55

1920 71 60 68 48 85 78 95 108 117 160

1930 99 56 168 83 122 77 80 99 62 91

1940 47 58 61 145 97 124 74 117 71 100

1950 82 181 157 117 250 180 185 332 234 162

1960 109 245 181 102 188 137 133 207 154 150

1970 102 59 110 88 123 65 177 104 118 50

1980 78 60 46 37 33 44 7 5 11 12

1990 11 15 10 8 7 5 4 5 33 27

2000 29 0 69 77 61 65 98 137 106 194

2010 79 104 80 49 91 0 0

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1733B 1849 to 2016 168 years Series 16

[B] Entire series, effect on correlation ( .524) is:

Lower 1899> -.015 1998< -.012 1995> -.012 1997> -.009 1926< -.009 1960< -.008 Higher 1890 .031 1864 .024

1733B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1849 130

1850 164 227 178 254 167 129 193 261 227 170

1860 127 208 168 193 103 222 238 267 246 251

1870 190 196 234 232 278 210 210 332 170 225

1880 229 275 171 205 123 200 185 207 182 255

1890 101 156 209 117 190 183 292 284 169 264

1900 189 209 349 322 317 317 232 178 118 89

1910 101 103 111 83 91 137 101 83 96 72

1920 118 84 94 74 70 74 67 107 116 94

1930 74 162 163 94 146 82 77 79 69 77

1940 56 67 117 149 119 104 68 108 54 59

1950 51 103 78 83 163 123 141 146 91 79

1960 44 81 59 80 111 66 71 106 127 132

1970 102 68 76 71 58 53 107 86 77 50

1980 53 57 52 48 70 55 57 42 24 54

1990 53 36 39 40 32 29 36 43 16 21

2000 22 11 26 29 26 44 42 42 52 57

2010 34 46 20 20 44 12 19

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1735A 1880 to 2016 137 years Series 17

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

Lower 2016> -.019 1893> -.012 2006< -.012 2008< -.011 1941< -.010 1988> -.009 Higher 1890 .021 1995 .012

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

2016 +3.0 SD

1735A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1880 252 254 111 172 118 124 119 112 124 157

1890 96 182 206 198 178 139 190 206 177 165

1900 199 245 196 182 244 224 198 160 133 156

1910 150 124 207 155 162 200 178 131 169 135

1920 179 142 119 128 145 190 187 212 186 206

1930 188 229 307 175 194 231 177 192 197 135

1940 191 102 151 161 185 181 179 208 131 134

1950 183 293 254 208 357 308 220 238 255 192

1960 167 206 97 74 89 63 51 61 42 58

1970 47 57 54 67 58 61 177 109 96 63

1980 113 108 74 121 171 103 234 242 172 366

1990 384 270 263 187 193 92 107 135 140 114

2000 195 120 186 136 126 112 94 177 117 163

2010 181 175 148 199 290 253 335

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1735B 1882 to 2016 135 years Series 18

[B] Entire series, effect on correlation ( .475) is:

Lower 1922< -.045 1902< -.021 2006< -.019 1893> -.013 1889< -.011 1916< -.010 Higher 1890 .025 1995 .016

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

1922 -6.6 SD

1735B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1882 85 152 101 170 137 101 126 129

1890 97 152 200 235 251 230 265 258 257 218

1900 275 294 216 252 356 278 273 251 217 206

1910 255 176 239 206 214 240 175 150 175 151

1920 159 124 76 108 124 150 163 192 159 174

1930 170 234 215 162 223 260 244 295 297 181

1940 225 125 227 283 237 187 230 233 158 129

1950 139 219 176 175 257 218 151 264 302 345

1960 533 669 419 203 260 184 186 236 223 291

1970 230 269 317 258 226 162 346 206 145 131

1980 127 130 110 121 131 86 137 121 94 162

1990 283 221 237 228 198 107 133 202 179 134

2000 238 177 164 183 164 155 80 69 144 148

2010 95 74 72 96 100 99 68

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1736A 1888 to 2016 129 years Series 19

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

Lower 1934< -.021 1996< -.016 1988> -.015 1919> -.014 2010< -.013 1968< -.012 Higher 1995 .017 1948 .012

1736A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1888 231 264

1890 161 290 367 222 188 148 230 271 160 198

1900 136 250 312 273 250 238 205 131 121 235

1910 291 128 269 294 258 288 322 166 250 269

1920 236 245 184 156 204 212 226 267 255 228

1930 260 299 298 197 130 221 192 207 217 150

1940 136 132 187 219 132 199 111 147 52 83

1950 61 140 156 99 144 163 189 258 209 160

1960 167 285 110 123 227 183 158 200 63 105

1970 108 99 113 126 184 118 149 111 148 76

1980 133 130 150 97 99 78 113 111 90 113

1990 85 76 75 81 124 41 30 43 36 40

2000 78 32 47 53 46 48 53 42 34 58

2010 18 29 28 37 37 18 17

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1736B 1884 to 2016 133 years Series 20

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

Lower 1998< -.036 1934< -.018 1919> -.014 1997> -.011 1988> -.011 1972< -.008 Higher 1995 .019 1890 .011

1736B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1884 207 203 269 306 277 334

1890 158 246 271 158 186 158 307 326 238 171

1900 99 202 278 220 202 190 169 115 107 183

1910 270 130 309 262 212 288 281 216 285 267

1920 256 241 168 154 196 221 239 252 199 229

1930 274 318 282 179 95 160 169 156 102 111

1940 108 114 213 253 178 200 131 152 127 109

1950 103 193 263 168 244 191 181 248 281 187

1960 182 266 108 109 258 187 164 230 67 217

1970 73 154 83 110 203 94 158 76 122 76

1980 117 114 120 108 104 68 92 79 67 58

1990 62 46 61 62 109 29 38 78 14 31

2000 80 43 53 58 51 50 45 39 71 127

2010 34 59 56 49 54 39 22

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1738A 1866 to 2016 151 years Series 21

[B] Entire series, effect on correlation ( .553) is:

Lower 1973< -.063 1890> -.017 1928> -.012 2007< -.008 1872< -.008 1977> -.007 Higher 1975 .025 1899 .012

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

1973 -4.6 SD

1738A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1866 365 270 196 283

1870 179 205 143 122 155 189 164 208 184 192

1880 181 251 177 258 159 199 193 214 189 235

1890 169 184 239 126 126 120 104 128 71 29

1900 46 57 73 41 41 52 68 47 45 52

1910 41 34 55 25 17 28 63 30 34 20

1920 45 24 82 46 49 110 137 165 201 225

1930 184 140 162 107 131 164 138 107 73 136

1940 136 82 120 99 84 91 57 121 47 48

1950 55 68 32 31 93 109 109 159 135 120

1960 124 143 87 74 84 75 59 69 71 79

1970 65 61 70 42 68 42 72 64 56 58

1980 53 51 58 57 45 50 87 48 29 57

1990 70 45 33 36 42 26 68 39 94 61

2000 94 146 185 116 104 86 109 65 206 255

2010 172 141 159 152 171 195 165

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1738B 1858 to 2016 159 years Series 22

[B] Entire series, effect on correlation ( .577) is:

Lower 2007< -.022 1955< -.019 1963> -.013 1904< -.013 2000< -.012 1957< -.011 Higher 1864 .024 1899 .011

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

1874 +3.0 SD

1738B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1858 407 323

1860 272 379 302 381 173 325 240 192 178 247

1870 165 227 222 208 324 253 181 203 154 145

1880 122 171 129 162 87 84 96 105 90 125

1890 71 83 101 49 76 82 71 106 57 26

1900 47 56 93 63 49 122 163 109 88 128

1910 112 101 157 91 102 143 171 142 171 100

1920 157 102 159 114 149 182 280 217 159 206

1930 194 139 167 125 173 180 128 140 79 115

1940 104 64 99 73 75 81 55 109 31 41

1950 45 50 48 41 86 33 42 57 83 110

1960 122 224 176 178 240 177 121 148 123 140

1970 128 156 183 224 155 135 275 200 204 198

1980 233 222 228 229 258 163 197 128 106 123

1990 169 145 160 114 181 70 100 80 94 52

2000 48 70 134 76 69 70 59 28 151 212

2010 161 162 175 214 169 196 147

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1739A 1927 to 2016 90 years Series 23

[B] Entire series, effect on correlation ( .571) is:

Lower 2016< -.047 1941> -.036 1928> -.019 1935< -.014 1971> -.013 1964< -.012 Higher 1999 .020 1975 .015

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

2016 -5.6 SD

1739A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1927 121 87 33

1930 20 25 45 19 55 21 53 55 58 71

1940 253 215 161 132 108 119 104 166 107 94

1950 109 615 402 353 576 576 269 472 439 371

1960 416 429 348 306 239 197 211 281 305 462

1970 193 315 286 270 274 189 359 175 248 237

1980 278 286 204 246 239 185 305 184 146 212

1990 223 123 180 133 213 103 228 150 150 100

2000 322 145 205 156 202 236 206 231 202 297

2010 209 219 187 209 206 172 90

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1739B 1927 to 2016 90 years Series 24

[B] Entire series, effect on correlation ( .647) is:

Lower 2007< -.021 1977< -.019 1971> -.015 2011> -.014 1938> -.014 1935< -.012 Higher 1995 .032 1975 .020

1739B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1927 54 60 131

1930 187 127 94 29 42 54 88 100 310 283

1940 194 131 205 166 142 169 156 209 143 130

1950 124 576 491 298 493 584 351 536 462 356

1960 456 519 362 268 265 211 189 234 316 492

1970 244 305 273 311 269 178 314 160 238 191

1980 290 225 206 221 292 234 284 209 154 265

1990 247 122 174 132 158 90 145 105 124 92

2000 230 138 133 115 103 141 109 65 112 178

2010 90 226 143 210 140 112 74

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1740A 1897 to 2016 120 years Series 25

[B] Entire series, effect on correlation ( .661) is:

Lower 1922> -.019 1898> -.018 1904< -.013 1913> -.013 1927< -.010 1917> -.009 Higher 1995 .016 1949 .013

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

1922 +3.3 SD

1740A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1897 204 220 186

1900 201 216 196 254 190 209 263 191 168 269

1910 285 190 315 327 325 278 329 290 286 247

1920 271 297 382 234 261 291 312 235 243 241

1930 247 312 283 205 207 309 246 271 264 212

1940 320 210 263 357 271 260 225 384 261 139

1950 175 303 321 229 434 471 364 557 444 448

1960 486 539 438 294 364 341 315 391 327 331

1970 267 261 389 427 386 235 435 275 323 263

1980 412 299 312 296 360 308 426 289 221 420

1990 473 269 319 249 321 179 299 208 277 148

2000 262 261 219 247 244 263 302 277 271 302

2010 237 269 199 288 203 171 131

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1740B 1897 to 2016 120 years Series 26

[B] Entire series, effect on correlation ( .512) is:

Lower 2011< -.041 1912< -.036 1899> -.022 1917> -.016 1969< -.013 1911> -.010 Higher 1999 .028 1988 .026

1740B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1897 192 178 201

1900 159 192 214 272 246 202 201 198 184 162

1910 200 257 154 245 286 310 353 343 263 240

1920 248 315 358 216 287 317 328 322 276 274

1930 253 286 288 196 215 288 241 244 316 238

1940 329 298 365 381 269 258 163 296 180 169

1950 174 425 484 470 537 461 396 437 365 335

1960 355 330 198 132 216 144 148 184 255 147

1970 168 166 206 204 265 178 319 209 248 217

1980 276 192 192 152 156 144 168 116 82 183

1990 199 142 222 166 182 122 271 178 270 118

2000 220 245 207 234 309 342 341 324 233 233

2010 235 103 149 246 200 172 147

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1740C 1897 to 2016 120 years Series 27

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

Lower 1900> -.018 1899> -.017 1919> -.013 1917> -.011 1904< -.010 1905< -.010 Higher 1995 .037 1988 .024

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

1900 +3.2 SD

1740C Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1897 198 202 211

1900 273 265 276 191 164 163 170 163 151 239

1910 268 165 296 265 251 266 342 327 321 326

1920 339 452 396 292 384 305 331 260 228 218

1930 193 254 234 151 172 219 203 215 250 232

1940 311 152 250 309 226 275 187 357 199 134

1950 132 434 395 400 415 394 338 417 354 332

1960 386 429 280 216 243 213 200 289 280 350

1970 256 241 329 441 357 220 297 228 262 237

1980 323 271 274 247 298 244 256 203 139 218

1990 230 172 221 185 232 131 201 158 206 143

2000 241 251 228 274 281 338 385 314 239 252

2010 269 307 176 272 197 198 204

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1741A 1884 to 2016 133 years Series 28

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

Lower 2011< -.069 1976< -.020 1995> -.011 1999> -.008 1915< -.008 1893> -.008 Higher 1890 .017 1988 .016

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

2011 -5.9 SD

1741A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1884 302 247 289 463 387 463

1890 177 260 303 286 236 180 252 247 132 169

1900 183 272 305 246 298 370 285 172 174 149

1910 141 143 184 221 176 154 234 151 267 152

1920 248 256 214 171 225 248 261 255 217 276

1930 340 387 357 196 278 260 206 228 274 268

1940 299 178 285 417 248 350 173 338 161 96

1950 115 200 152 110 175 263 187 235 212 165

1960 118 239 250 157 223 210 146 174 208 290

1970 147 97 225 238 300 177 185 209 327 335

1980 421 319 302 356 493 294 515 236 150 309

1990 327 251 326 345 557 311 587 316 408 315

2000 508 402 307 219 202 267 222 275 262 348

2010 229 125 206 237 199 217 184

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1741B 1885 to 2016 132 years Series 29

[B] Entire series, effect on correlation ( .608) is:

Lower 2003< -.010 1910< -.010 1898> -.010 2012> -.009 2000< -.009 1999> -.008 Higher 1975 .015 1988 .015

1741B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1885 146 209 318 209 316

1890 161 274 249 145 181 190 210 262 249 206

1900 221 270 299 205 187 275 266 140 146 127

1910 123 125 147 154 159 156 270 201 329 221

1920 278 255 267 172 277 289 298 217 169 276

1930 250 303 296 175 237 306 215 234 206 201

1940 256 166 258 455 261 313 141 308 41 49

1950 75 165 176 146 262 221 159 336 321 314

1960 315 477 426 289 362 314 242 269 277 302

1970 228 237 364 438 364 218 307 230 383 271

1980 414 336 298 232 293 179 368 214 141 210

1990 175 184 199 196 428 119 271 97 299 183

2000 188 239 236 165 305 278 353 418 377 366

2010 405 311 530 399 432 582 446

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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 1726A 1861 2016 156 6 0 .720 1.58 2.82 .492 .400 .281 2.55 .441 -.053 2

2 1726B 1890 2016 127 5 0 .715 1.52 3.09 .538 .418 .316 2.72 .504 -.082 1

3 1727A 1877 2016 140 5 0 .695 1.95 4.04 .730 .599 .274 2.66 .426 -.001 1

4 1727B 1888 2016 129 5 0 .721 1.67 3.77 .605 .691 .242 2.60 .476 -.076 1

5 1728A 1880 2016 137 5 0 .595 2.04 4.57 .854 .677 .271 2.75 .429 -.031 2

6 1728B 1883 2016 134 5 0 .665 2.01 4.63 .942 .761 .276 2.78 .493 -.020 2

7 1729A 1879 2016 138 5 0 .661 1.81 3.64 .814 .496 .363 2.61 .452 -.040 1

8 1729B 1891 2016 126 5 0 .700 1.55 3.48 .733 .685 .312 2.60 .507 -.078 1

9 1730A 1863 2016 154 6 0 .675 1.58 6.09 .960 .720 .321 2.80 .479 -.052 2

10 1730B 1902 2016 115 4 0 .684 2.19 5.68 1.092 .587 .310 2.64 .510 -.091 2

11 1731A 1855 2016 162 6 1 .583 1.63 5.38 1.229 .749 .381 2.50 .335 -.018 1

12 1731B 1863 2016 154 6 0 .626 1.63 4.51 .994 .725 .318 2.43 .294 -.017 2

13 1732A 1860 2016 157 6 0 .515 1.12 3.68 .782 .792 .363 2.61 .483 -.010 2

14 1732B 1847 2016 170 7 0 .530 1.09 4.68 .849 .816 .343 2.80 .389 .010 2

15 1733A 1850 2016 167 6 1 .425 1.16 3.32 .682 .627 .391 2.82 .568 .028 2

16 1733B 1849 2016 168 7 0 .524 1.23 3.49 .796 .830 .283 2.66 .418 -.054 1

17 1735A 1880 2016 137 5 0 .567 1.68 3.84 .672 .676 .247 2.69 .376 -.076 1

18 1735B 1882 2016 135 5 0 .475 1.96 6.69 .849 .727 .235 2.64 .374 .048 1

19 1736A 1888 2016 129 5 0 .527 1.55 3.67 .834 .754 .296 2.66 .520 .016 1

20 1736B 1884 2016 133 5 0 .511 1.58 3.34 .836 .702 .335 2.91 .497 .013 1

21 1738A 1866 2016 151 6 0 .553 1.08 3.65 .669 .824 .306 2.72 .450 -.031 1

22 1738B 1858 2016 159 6 0 .577 1.43 4.07 .743 .752 .299 2.79 .516 -.026 1

23 1739A 1927 2016 90 3 0 .571 2.16 6.15 1.262 .649 .345 2.55 .389 .028 1

24 1739B 1927 2016 90 3 0 .647 2.15 5.84 1.269 .691 .345 2.79 .526 -.032 1

25 1740A 1897 2016 120 5 0 .661 2.89 5.57 .829 .492 .226 2.57 .407 .010 1

26 1740B 1897 2016 120 5 0 .512 2.44 5.37 .857 .692 .228 2.64 .459 -.054 1

27 1740C 1897 2016 120 5 0 .653 2.61 4.52 .760 .572 .211 2.60 .469 -.072 1

28 1741A 1884 2016 133 5 0 .582 2.56 5.87 .943 .451 .296 2.47 .374 .019 1

29 1741B 1885 2016 132 5 0 .608 2.57 5.82 .958 .472 .299 2.82 .564 .031 2

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Total or mean: 3983 152 2 .599 1.76 6.69 .836 .662 .302 2.91 .451 -.024

- = [ COFECHA ACRU COF ] = -