[] Dendrochronology Program Library Run PIRE Program COF 15:55 Thu 24 Feb 2016 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 29642

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: PIRE\_CORE7RP\_Original-50

File of DATED series: PIRE\_CORE7RP

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 1931 to 2015 85 years

Continuous time span is 1931 to 2015 85 years

Portion with two or more series is 1933 to 2015 83 years

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

\*C\* Number of dated series 30 \*C\*

\*O\* Master series 1931 2015 85 yrs \*O\*

\*F\* Total rings in all series 2223 \*F\*

\*E\* Total dated rings checked 2221 \*E\*

\*C\* Series intercorrelation .629 \*C\*

\*H\* Average mean sensitivity .201 \*H\*

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

\*\*\* Mean length of series 74.1 \*\*\*

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

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

No ring measurements of zero value

1950 .041 28 2000 .132 30

1951 .087 28 2001 1.283 30

1952 .311 28 2002 1.491 30

1953 -.369 28 2003 .358 30

1954 .626 30 2004 1.096 30

1955 .637 30 2005 .651 30

1956 -1.773 30 2006 -.255 30

1957 -.893 30 2007 -1.257 30

1958 .481 30 2008 -2.882 30

1959 .627 30 2009 -2.337 30

1960 .933 30 2010 .092 30

1961 1.680 30 2011 -.545 30

1962 .991 30 2012 .259 30

1963 -.162 30 2013 1.211 30

1964 -1.297 30 2014 1.051 30

1965 -.846 30 2015 .792 30

1966 -.415 30

1967 -.774 30

1968 .588 30

1969 .051 30

1970 -.085 30

1971 .327 30

1972 .264 30

1973 1.496 30

1974 .188 30

1975 .471 30

1976 .854 30

1977 -1.178 30

1978 -1.214 30

1979 -2.015 30

1980 .190 30

1931 .337 1 1981 .483 30

1932 -2.569 1 1982 .542 30

1933 .238 2 1983 -1.195 30

1934 -.058 2 1984 -1.863 30

1935 -.049 3 1985 -.867 30

1936 -1.390 5 1986 -.202 30

1937 1.378 6 1987 1.145 30

1938 1.224 9 1988 .837 30

1939 -.159 12 1989 .999 30

1940 -.008 14 1990 1.141 30

1941 .704 16 1991 1.514 30

1942 1.403 17 1992 .352 30

1943 -.692 20 1993 -.461 30

1944 -.102 21 1994 .742 30

1945 .276 22 1995 .246 30

1946 -.722 24 1996 .280 30

1947 -.063 24 1997 -1.741 30

1948 -1.348 25 1998 .003 30

1949 .026 27 1999 -1.345 30

PART 5: CORRELATION OF SERIES BY SEGMENTS: PIRE\_CORE7RP\_Original-50 15:55 Thu 24 Feb 2016 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 1925 1950 1975

1974 1999 2024

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

1 1978A 1931 2015 .49 .67 .72

2 1978B 1939 2015 .46 .73 .70

3 1970A 1940 2015 .62 .72 .79

4 1970B 1946 2015 .47 .51 .76

5 1980A 1937 2015 .42 .41 .71

6 1980B 1950 2015 .51 .61

7 1975A 1954 2015 .73 .71

8 1975B 1938 2015 .46 .52 .52

9 1981A 1939 2015 .69 .67 .70

10 1981B 1944 2015 .55 .60 .67

11 1982A 1942 2015 .66 .67 .67

12 1982B 1945 2015 .47 .45 .61

13 1979A 1936 2015 .46 .65 .66

14 1979B 1941 2015 .66 .69 .71

15 1983A 1939 2015 .54 .50 .57

16 1983B 1941 2015 .75 .72 .72

17 1971A 1938 2015 .67 .71 .74

18 1971B 1943 2015 .52 .64 .72

19 1984A 1954 2015 .73 .75

20 1984B 1933 2015 .53 .65 .69

21 1974A 1938 2015 .59 .59 .64

22 1974B 1935 2015 .46 .63 .79

23 1977A 1940 2015 .74 .71 .69

24 1977B 1943 2015 .69 .69 .66

25 1973A 1943 2015 .46 .68 .74

26 1973B 1948 2015 .69 .64 .72

27 1972A 1949 2015 .70 .69 .67

28 1972B 1946 2015 .37 .52 .63

29 1976A 1936 2015 .55 .59 .69

30 1976B 1949 2015 .65 .66 .71

Av segment correlation .57 .63 .69

PART 6: POTENTIAL PROBLEMS: PIRE\_CORE7RP\_Original-50 15:55 Thu 24 Feb 2016 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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1978A 1931 to 2015 85 years Series 1

[\*] Early part of series cannot be checked from 1931 to 1932 -- not matched by another series

[B] Entire series, effect on correlation ( .589) is:

Lower 1936< -.067 1946> -.025 1933> -.018 1934> -.014 1959< -.013 2000< -.009 Higher 1956 .028 1948 .013

1978A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1931 318 105 426 438 330 74 472 345 286

1940 344 357 512 309 354 344 401 320 234 313

1950 254 346 296 205 284 229 160 183 186 151

1960 167 199 179 165 141 137 103 85 136 194

1970 168 231 232 227 135 145 167 122 104 93

1980 113 113 124 105 97 112 117 129 147 122

1990 135 136 112 83 146 107 76 60 89 62

2000 58 93 80 76 95 70 46 40 36 33

2010 66 58 65 100 75 92

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

1978B 1939 to 2015 77 years Series 2

[B] Entire series, effect on correlation ( .575) is:

Lower 1941< -.074 1943> -.030 1979> -.021 1939> -.014 1944> -.010 2008> -.010 Higher 1956 .056 1997 .034

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

1944 +3.3 SD

1978B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1939 439

1940 399 338 378 395 471 381 341 356 296 274

1950 329 270 292 228 344 253 151 143 225 185

1960 213 256 260 165 137 166 165 191 209 217

1970 137 183 181 170 123 143 151 111 80 112

1980 157 148 136 80 57 70 80 104 106 94

1990 94 128 97 89 92 84 92 58 84 62

2000 66 73 84 60 74 54 47 40 41 40

2010 61 48 45 71 58 63

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1970A 1940 to 2015 76 years Series 3

[B] Entire series, effect on correlation ( .698) is:

Lower 1956> -.025 1942< -.023 1967> -.020 1974< -.011 1952< -.010 1969> -.009 Higher 2008 .034 1997 .023

1970A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1940 391 435 350 315 324 401 310 297 238 232

1950 222 224 190 190 185 269 198 170 240 220

1960 210 248 186 127 134 143 155 193 169 181

1970 151 145 130 179 104 109 148 89 88 67

1980 110 119 121 98 85 129 128 145 156 157

1990 177 172 136 96 175 177 146 86 152 104

2000 106 166 174 141 121 104 103 84 49 66

2010 73 70 63 101 104 73

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1970B 1946 to 2015 70 years Series 4

[B] Entire series, effect on correlation ( .578) is:

Lower 1953< -.061 1962< -.029 1946> -.021 1949< -.015 1974> -.010 1996< -.010 Higher 2008 .050 1979 .020

1970B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 319 320 269 239

1950 285 253 276 186 266 223 191 223 228 267

1960 284 240 155 157 137 127 158 156 175 116

1970 132 123 116 165 167 153 144 103 104 78

1980 91 117 115 86 99 125 120 139 173 174

1990 147 192 127 109 128 127 96 88 115 86

2000 98 166 174 134 133 139 116 88 48 65

2010 100 85 94 132 129 103

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1980A 1937 to 2015 79 years Series 5

[B] Entire series, effect on correlation ( .556) is:

Lower 1959< -.045 1956> -.042 1995< -.038 1964> -.022 1969> -.020 1999> -.012 Higher 2008 .049 1977 .017

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

1969 +3.3 SD

1980A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1937 401 352 131

1940 131 154 161 131 183 209 120 107 95 149

1950 94 88 79 82 122 95 88 98 96 58

1960 69 89 77 72 102 68 77 52 145 202

1970 135 95 83 146 81 101 96 65 63 71

1980 119 124 122 100 98 118 124 207 151 161

1990 180 158 135 119 138 97 134 106 176 139

2000 171 151 173 125 113 127 123 96 75 69

2010 138 106 118 156 147 144

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1980B 1950 to 2015 66 years Series 6

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

Lower 1971< -.033 1956> -.022 1975< -.019 1968< -.019 1969> -.019 1952< -.014 Higher 1979 .028 1997 .022

1980B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1950 128 109 95 103 158 149 121 140 144 171

1960 125 144 132 111 104 142 141 122 116 184

1970 147 112 160 192 160 129 171 146 173 113

1980 205 235 234 149 156 204 211 234 273 306

1990 212 252 211 194 195 161 218 149 236 191

2000 336 294 236 177 200 191 170 105 107 97

2010 135 109 148 147 129 153

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1975A 1954 to 2015 62 years Series 7

[B] Entire series, effect on correlation ( .729) is:

Lower 1964> -.015 1999< -.013 1967< -.012 2008> -.007 1993> -.005 1979> -.005 Higher 1956 .035 1997 .009

1975A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1954 255 268 111 132 237 294

1960 316 262 198 185 175 153 144 77 113 85

1970 109 178 138 175 117 132 145 97 88 81

1980 104 98 118 76 79 112 203 220 292 268

1990 218 299 212 213 196 223 212 149 195 115

2000 195 215 194 152 163 163 141 133 117 110

2010 194 130 138 147 169 174

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1975B 1938 to 2015 78 years Series 8

[B] Entire series, effect on correlation ( .447) is:

Lower 1956> -.046 1969< -.035 1944< -.034 2015< -.020 1999> -.018 2004< -.013 Higher 1977 .040 2008 .025

1975B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1938 293 246

1940 261 381 420 304 132 137 100 92 103 145

1950 164 165 192 168 161 178 175 165 163 199

1960 187 181 168 140 110 96 81 56 119 63

1970 119 110 111 137 109 122 141 71 81 74

1980 129 120 98 70 60 70 120 176 177 214

1990 166 175 155 155 160 131 133 112 137 148

2000 189 168 224 156 136 190 145 112 98 128

2010 148 162 181 153 144 116

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1981A 1939 to 2015 77 years Series 9

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

Lower 1987< -.027 2001< -.021 1939> -.011 1964> -.011 1944< -.010 1971< -.008 Higher 1956 .023 1948 .012

1981A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1939 265

1940 232 266 318 214 181 193 189 197 147 186

1950 184 163 189 179 191 204 104 151 159 232

1960 183 177 161 127 138 123 108 121 145 129

1970 143 113 106 177 134 149 144 104 97 75

1980 149 173 154 117 76 110 112 97 137 152

1990 181 209 153 147 157 174 145 109 110 103

2000 116 97 125 118 145 120 82 69 52 52

2010 104 81 98 105 112 88

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1981B 1944 to 2015 72 years Series 10

[B] Entire series, effect on correlation ( .646) is:

Lower 1988< -.028 1966< -.017 1958< -.015 1946> -.014 1983> -.009 1980< -.009 Higher 1997 .018 1979 .017

1981B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1944 199 206 220 219 169 260

1950 248 184 190 168 215 181 140 169 151 150

1960 191 231 225 164 112 137 110 131 137 157

1970 141 128 181 209 155 156 161 127 128 94

1980 108 144 144 129 112 116 153 153 111 145

1990 149 165 127 121 120 134 118 83 115 89

2000 122 172 171 91 101 97 76 51 46 39

2010 86 51 84 94 100 103

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1982A 1942 to 2015 74 years Series 11

[B] Entire series, effect on correlation ( .671) is:

Lower 1950< -.029 1968< -.025 2009> -.017 2005< -.013 2013< -.009 1984> -.008 Higher 1997 .028 1956 .024

1982A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1942 236 144 163 176 152 177 139 165

1950 117 140 174 164 171 163 103 98 179 218

1960 174 270 190 191 149 185 145 125 88 75

1970 95 98 113 160 166 178 149 107 121 96

1980 154 197 199 155 162 169 189 200 236 221

1990 250 251 225 206 232 191 160 80 134 107

2000 106 140 138 152 176 103 82 74 51 79

2010 89 70 94 72 70 79

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1982B 1945 to 2015 71 years Series 12

[B] Entire series, effect on correlation ( .564) is:

Lower 1977> -.035 1968< -.020 1956> -.019 1970< -.013 1969< -.010 1948< -.010 Higher 2008 .044 1983 .019

1982B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1945 150 147 165 142 192

1950 181 177 166 182 236 213 192 176 225 260

1960 240 263 252 217 174 244 242 218 151 92

1970 78 144 137 210 198 241 259 247 170 170

1980 221 259 243 148 168 179 203 239 217 266

1990 249 211 175 142 188 153 136 103 117 123

2000 168 158 209 157 219 157 132 105 63 69

2010 125 110 92 114 117 101

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1979A 1936 to 2015 80 years Series 13

[B] Entire series, effect on correlation ( .544) is:

Lower 1939< -.112 2014< -.015 1960< -.009 1975< -.008 1976< -.007 1945< -.006 Higher 1956 .021 1999 .011

1979A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1936 250 311 329 187

1940 249 250 256 221 263 220 182 224 206 236

1950 257 232 236 181 276 203 140 173 273 246

1960 170 174 195 119 101 99 122 119 163 154

1970 150 146 161 138 81 75 83 77 86 74

1980 123 130 114 107 99 148 148 149 159 202

1990 220 186 111 85 110 111 112 84 120 85

2000 118 146 123 126 154 158 100 85 75 69

2010 103 85 96 104 78 79

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1979B 1941 to 2015 75 years Series 14

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

Lower 1946< -.033 1973< -.020 1988< -.014 1983> -.013 1961< -.009 1967> -.008 Higher 1956 .035 1979 .015

1979B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1941 277 260 232 270 267 195 235 182 195

1950 218 226 202 187 201 178 120 176 203 234

1960 223 184 208 121 97 118 156 169 254 212

1970 143 154 173 123 79 114 129 80 65 56

1980 124 134 145 129 94 131 144 220 137 147

1990 144 208 148 122 134 120 117 87 113 101

2000 120 215 239 154 188 151 128 71 46 51

2010 108 102 86 115 95 86

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1983A 1939 to 2015 77 years Series 15

[B] Entire series, effect on correlation ( .520) is:

Lower 1991< -.033 1989< -.031 1999> -.019 1939> -.017 1962< -.016 1983> -.012 Higher 1997 .028 1979 .021

1983A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1939 309

1940 294 270 333 256 214 197 199 152 94 129

1950 113 133 173 197 198 219 168 162 160 174

1960 192 204 150 145 121 157 188 141 218 161

1970 152 124 99 161 208 252 243 147 106 73

1980 118 142 171 152 107 98 130 142 136 113

1990 154 127 147 125 158 153 158 113 161 161

2000 151 246 280 187 210 133 103 83 63 58

2010 62 80 83 76 73 65

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1983B 1941 to 2015 75 years Series 16

[B] Entire series, effect on correlation ( .723) is:

Lower 2005< -.021 1997> -.020 1965> -.014 1996< -.011 1946> -.010 2015< -.009 Higher 2008 .034 1956 .031

1983B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1941 304 268 158 165 132 159 156 128 129

1950 115 110 145 127 155 211 115 140 154 167

1960 219 295 229 135 108 215 191 172 207 186

1970 176 213 156 206 147 163 146 130 157 100

1980 200 194 212 140 117 158 195 272 221 204

1990 290 238 194 157 189 191 146 146 162 142

2000 187 216 191 145 190 111 126 100 60 80

2010 123 112 138 143 131 89

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1971A 1938 to 2015 78 years Series 17

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

Lower 1967> -.015 1955< -.012 1971< -.011 2007> -.010 2000< -.010 1957< -.008 Higher 2008 .036 1956 .026

1971A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1938 410 310

1940 396 583 564 308 302 386 349 302 232 312

1950 272 305 276 181 230 193 130 128 199 194

1960 175 187 197 134 112 138 169 166 140 91

1970 95 92 116 128 112 154 152 79 79 70

1980 95 115 125 91 94 89 97 179 158 126

1990 181 182 132 131 134 135 135 77 119 109

2000 99 147 170 105 140 123 96 94 55 74

2010 126 82 65 88 79 66

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1971B 1943 to 2015 73 years Series 18

[B] Entire series, effect on correlation ( .628) is:

Lower 1943> -.054 1954< -.031 1967< -.030 1985> -.016 1962< -.009 1964> -.008 Higher 1956 .052 2008 .024

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

1985 +3.6 SD

1971B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1943 276 260 250 233 223 205 201

1950 244 198 242 193 150 178 121 138 233 175

1960 172 202 146 156 144 138 143 101 118 117

1970 116 129 145 144 121 126 138 90 97 76

1980 96 144 131 114 98 180 157 155 133 112

1990 125 118 99 82 122 98 98 80 110 76

2000 96 130 140 107 106 91 91 64 55 64

2010 78 78 84 93 93 92

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1984A 1954 to 2015 62 years Series 19

[B] Entire series, effect on correlation ( .726) is:

Lower 1959< -.031 2011< -.023 2006> -.011 1972< -.011 1999> -.011 1988< -.009 Higher 2008 .014 1979 .012

1984A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1954 187 266 147 162 268 177

1960 227 307 245 197 147 150 176 191 251 183

1970 171 194 158 220 163 189 214 158 139 105

1980 176 180 194 129 125 143 166 195 149 155

1990 149 182 130 130 179 162 148 92 106 107

2000 125 149 148 132 130 116 112 58 36 39

2010 70 45 62 77 96 72

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1984B 1933 to 2015 83 years Series 20

[B] Entire series, effect on correlation ( .602) is:

Lower 1933< -.022 1936> -.018 1953> -.015 1934< -.014 1956> -.009 1969> -.007 Higher 1977 .022 1997 .018

1984B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1933 228 190 257 242 387 404 257

1940 238 289 276 117 170 142 129 109 73 110

1950 77 71 128 171 162 185 139 158 146 149

1960 140 147 177 157 111 141 139 145 217 249

1970 251 239 232 254 253 208 182 99 123 112

1980 163 160 180 151 97 108 139 189 150 170

1990 202 252 171 151 180 143 187 121 155 89

2000 86 99 104 68 69 79 66 56 36 34

2010 34 38 48 54 49 51

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1974A 1938 to 2015 78 years Series 21

[B] Entire series, effect on correlation ( .614) is:

Lower 1979> -.025 1956> -.023 1939> -.016 2011> -.014 1967> -.011 1950< -.010 Higher 1977 .019 1943 .018

1974A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1938 363 389

1940 437 374 345 207 237 234 165 200 145 155

1950 113 139 108 110 133 143 118 128 142 150

1960 143 153 122 109 73 66 80 100 117 103

1970 95 95 94 114 102 89 106 71 68 83

1980 106 115 101 66 63 58 52 104 135 154

1990 147 127 122 113 122 161 183 125 150 80

2000 129 114 102 91 92 93 79 63 46 38

2010 55 68 64 63 61 56

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1974B 1935 to 2015 81 years Series 22

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

Lower 1940< -.050 1954< -.033 1936> -.021 1964> -.011 1939> -.010 1948> -.010 Higher 2008 .030 1956 .024

1974B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1935 353 347 361 392 353

1940 242 319 307 195 206 257 203 196 185 173

1950 190 154 172 161 104 114 75 85 110 99

1960 122 173 128 117 102 65 81 64 64 49

1970 40 41 44 120 102 83 90 60 56 53

1980 71 68 73 43 40 46 53 74 76 107

1990 96 103 93 73 100 118 97 73 84 59

2000 89 96 118 82 101 96 77 51 28 29

2010 49 46 52 58 53 74

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1977A 1940 to 2015 76 years Series 23

[B] Entire series, effect on correlation ( .725) is:

Lower 1979> -.020 2002< -.014 2007> -.010 1995< -.010 2010< -.008 1993> -.007 Higher 2008 .029 1956 .014

1977A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1940 220 211 285 200 193 184 160 210 188 210

1950 228 252 232 162 232 205 139 124 184 190

1960 201 255 207 149 111 146 113 118 208 185

1970 147 215 170 166 145 131 125 98 98 116

1980 160 151 141 110 90 97 102 164 144 156

1990 180 213 175 163 144 101 143 107 148 79

2000 101 110 89 90 119 107 75 74 38 35

2010 42 46 67 65 58 64

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1977B 1943 to 2015 73 years Series 24

[B] Entire series, effect on correlation ( .707) is:

Lower 1981< -.041 1978> -.016 1953> -.010 1969> -.009 1947> -.008 1962< -.007 Higher 1956 .038 1997 .023

1977B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1943 142 165 178 140 236 178 196

1950 209 222 219 231 217 276 123 150 218 205

1960 245 215 146 130 93 85 107 115 140 170

1970 144 144 116 141 118 136 186 117 147 110

1980 142 86 102 98 84 73 97 140 120 147

1990 139 171 151 110 108 100 118 60 68 57

2000 83 83 94 97 115 93 55 38 27 26

2010 40 41 37 39 43 46

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1973A 1943 to 2015 73 years Series 25

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

Lower 1946> -.030 1943> -.028 1948> -.025 1947< -.018 1944< -.015 1963> -.014 Higher 1956 .060 1997 .040

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

1946 +3.1 SD

1973A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1943 219 196 213 224 178 183 169

1950 140 171 189 152 120 136 72 71 67 119

1960 121 136 90 119 79 63 74 53 93 59

1970 70 91 81 132 126 121 116 78 60 47

1980 85 79 59 49 53 48 44 89 94 121

1990 117 129 127 122 153 107 118 72 109 101

2000 105 149 163 123 118 100 99 83 65 75

2010 76 66 87 91 89 81

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1973B 1948 to 2015 68 years Series 26

[B] Entire series, effect on correlation ( .708) is:

Lower 1999> -.021 1974< -.019 1979> -.014 1998< -.014 1951> -.010 2005< -.010 Higher 2008 .042 1977 .011

1973B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1948 167 211

1950 166 258 205 173 150 130 84 100 109 121

1960 195 227 191 173 101 78 122 71 140 92

1970 110 97 111 165 84 102 105 51 60 68

1980 109 82 92 72 61 80 97 157 160 199

1990 188 150 115 100 125 143 161 110 94 109

2000 142 171 164 125 175 112 103 89 52 55

2010 85 80 115 115 89 89

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

1972A 1949 to 2015 67 years Series 27

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

Lower 1984> -.022 1952< -.014 2002< -.013 1999> -.013 1949< -.013 1953> -.013 Higher 1956 .052 1997 .030

1972A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1949 210

1950 272 263 204 225 194 192 134 178 183 178

1960 182 242 234 159 110 85 138 119 135 96

1970 102 124 114 141 117 103 103 69 51 53

1980 79 93 122 81 108 133 158 146 154 150

1990 129 165 180 126 219 178 141 79 92 91

2000 139 135 102 90 98 98 59 47 43 43

2010 79 81 78 97 106 88

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1972B 1946 to 2015 70 years Series 28

[B] Entire series, effect on correlation ( .566) is:

Lower 1948> -.046 1979> -.041 1959< -.012 1973< -.011 1956> -.009 2004< -.009 Higher 2008 .062 1997 .017

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

1979 +3.2 SD

1972B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1946 285 272 312 318

1950 272 252 272 236 283 212 176 172 174 136

1960 215 248 246 204 101 124 143 100 104 85

1970 128 126 115 101 91 88 119 93 94 109

1980 96 83 83 65 72 90 81 164 154 127

1990 133 133 149 141 154 123 130 92 134 70

2000 114 156 132 117 101 110 106 86 53 66

2010 104 74 89 106 92 69

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1976A 1936 to 2015 80 years Series 29

[B] Entire series, effect on correlation ( .607) is:

Lower 1948> -.028 1953< -.026 1946< -.025 1997> -.018 1979> -.016 1998< -.010 Higher 2008 .052 1956 .015

1976A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1936 106 130 170 129

1940 129 113 116 102 139 141 91 116 142 154

1950 147 147 193 109 133 136 98 106 141 138

1960 201 189 190 120 101 101 116 126 147 169

1970 151 183 165 196 169 162 128 96 101 121

1980 123 157 172 112 99 110 169 229 184 200

1990 198 167 126 130 144 132 136 123 103 93

2000 96 134 133 113 118 145 88 88 34 44

2010 72 43 43 77 68 57

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1976B 1949 to 2015 67 years Series 30

[B] Entire series, effect on correlation ( .693) is:

Lower 1952< -.028 1990< -.025 1989< -.017 1966< -.014 1953> -.014 2007> -.013 Higher 1956 .048 2008 .028

1976B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1949 165

1950 212 187 131 168 170 181 117 137 172 185

1960 158 167 213 142 111 131 115 149 237 203

1970 164 224 196 200 155 154 151 124 154 120

1980 177 166 169 123 100 132 140 129 128 108

1990 96 127 117 89 143 132 111 79 99 85

2000 129 150 124 124 140 106 76 79 50 44

2010 67 52 61 63 56 42

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

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

PART 7: DESCRIPTIVE STATISTICS: PIRE\_CORE7RP\_Original-50 15:55 Thu 24 Feb 2016 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 1978A 1931 2015 85 3 0 .589 1.76 5.12 1.129 .726 .258 2.56 .415 -.021 1

2 1978B 1939 2015 77 3 0 .575 1.65 4.71 1.110 .933 .192 2.71 .542 .103 1

3 1970A 1940 2015 76 3 0 .698 1.66 4.35 .823 .888 .189 2.71 .556 .048 1

4 1970B 1946 2015 70 3 0 .578 1.54 3.20 .641 .862 .178 2.53 .459 -.032 1

5 1980A 1937 2015 79 3 0 .556 1.25 4.01 .548 .646 .235 2.85 .609 .052 1

6 1980B 1950 2015 66 2 0 .567 1.68 3.36 .532 .666 .200 2.69 .499 -.025 1

7 1975A 1954 2015 62 2 0 .729 1.68 3.16 .615 .693 .223 2.62 .463 -.072 1

8 1975B 1938 2015 78 3 0 .447 1.51 4.20 .635 .793 .199 2.65 .527 .001 1

9 1981A 1939 2015 77 3 0 .689 1.44 3.18 .496 .763 .187 2.57 .366 -.011 1

10 1981B 1944 2015 72 3 0 .646 1.41 2.60 .477 .779 .186 2.76 .516 -.074 2

11 1982A 1942 2015 74 3 0 .671 1.49 2.70 .514 .747 .200 2.65 .507 -.055 1

12 1982B 1945 2015 71 3 0 .564 1.77 2.66 .532 .748 .184 2.54 .418 .008 1

13 1979A 1936 2015 80 3 0 .544 1.55 3.29 .645 .815 .182 2.48 .361 -.032 1

14 1979B 1941 2015 75 3 0 .692 1.54 2.77 .575 .750 .225 2.71 .504 .017 1

15 1983A 1939 2015 77 3 0 .520 1.57 3.33 .599 .789 .194 2.64 .487 .049 1

16 1983B 1941 2015 75 3 0 .723 1.67 3.04 .497 .561 .221 2.71 .538 -.013 1

17 1971A 1938 2015 78 3 0 .735 1.70 5.83 1.065 .869 .211 2.59 .506 .021 2

18 1971B 1943 2015 73 3 0 .628 1.36 2.76 .521 .841 .161 2.73 .518 .013 1

19 1984A 1954 2015 62 2 0 .726 1.52 3.07 .565 .704 .220 2.69 .568 -.008 3

20 1984B 1933 2015 83 3 0 .602 1.53 4.03 .752 .831 .200 2.63 .487 -.050 1

21 1974A 1938 2015 78 3 0 .614 1.28 4.37 .785 .924 .170 2.42 .419 -.055 1

22 1974B 1935 2015 81 3 0 .588 1.19 3.92 .865 .937 .202 2.62 .430 .015 1

23 1977A 1940 2015 76 3 0 .725 1.45 2.85 .570 .799 .195 2.78 .506 .012 1

24 1977B 1943 2015 73 3 0 .707 1.26 2.76 .587 .814 .200 2.58 .450 -.073 1

25 1973A 1943 2015 73 3 0 .583 1.08 2.24 .435 .825 .198 2.56 .504 -.065 1

26 1973B 1948 2015 68 3 0 .708 1.23 2.58 .461 .680 .248 2.68 .520 -.003 1

27 1972A 1949 2015 67 3 0 .661 1.30 2.72 .543 .821 .197 2.73 .549 .080 1

28 1972B 1946 2015 70 3 0 .566 1.41 3.18 .671 .882 .190 2.60 .444 -.008 1

29 1976A 1936 2015 80 3 0 .607 1.29 2.29 .400 .722 .184 2.64 .494 -.002 1

30 1976B 1949 2015 67 3 0 .693 1.33 2.37 .458 .754 .196 2.57 .531 -.020 2

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Total or mean: 2223 87 0 .629 1.47 5.83 .642 .787 .201 2.85 .489 -.006

- = [ COFECHA PIRE COF ] = -