[] Dendrochronology Program Library Run CH\_L Program COF 14:41 Wed 17 Jan 2007 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 26316

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: Camel's Hump-Low Corr1-30

File of DATED series: ch\_low\_compact\_corr1-30.dta

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 30 years lagged successively by 15 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 .4226

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 1912 to 2006 95 years

Continuous time span is 1912 to 2006 95 years

Portion with two or more series is 1914 to 2006 93 years

>> 166b 2006 absent in 1 of 20 series, but is not usually narrow: master index is -.124

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

164a 1 absent rings: 1945

166b 1 absent rings: 2006

2 absent rings .112%

Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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1950 .064 20 2000 -.834 20

1951 .154 20 2001 -.225 20

1952 1.003 20 2002 -.610 20

1953 -.707 20 2003 -.563 20

1954 -.318 20 2004 1.207 20

1955 .952 20 2005 .455 20

1956 1.222 20 2006 -.124 20 1<<

1957 -.001 20

1958 .703 20

1959 .535 20

1960 .146 20

1961 .382 20

1912 1.067 1 1962 .162 20

1913 .440 1 1963 .260 20

1914 -2.525 3 1964 1.147 20

1915 -2.227 5 1965 .626 20

1916 -.665 6 1966 -.243 20

1917 -.737 7 1967 .514 20

1918 -.440 11 1968 -1.204 20

1919 -.160 15 1969 -.055 20

1920 .302 16 1970 .259 20

1921 -.109 18 1971 -.340 20

1922 .357 19 1972 .384 20

1923 -.120 19 1973 -.433 20

1924 1.082 20 1974 -.757 20

1925 -1.816 20 1975 -.569 20

1926 -1.529 20 1976 -.523 20

1927 1.275 20 1977 .725 20

1928 1.188 20 1978 1.127 20

1929 .766 20 1979 -.049 20

1930 .195 20 1980 .186 20

1931 1.337 20 1981 -.005 20

1932 .972 20 1982 1.227 20

1933 .075 20 1983 .018 20

1934 .902 20 1984 -.586 20

1935 .806 20 1985 -2.097 20

1936 -3.014 20 1986 -.383 20

1937 -1.304 20 1987 .252 20

1938 -.095 20 1988 .839 20

1939 .760 20 1989 -.424 20

1940 .630 20 1990 .087 20

1941 .838 20 1991 .922 20

1942 .752 20 1992 -.332 20

1943 1.344 20 1993 .346 20

1944 .136 20 1994 1.250 20

1945 -4.515 20 1 1995 -.471 20

1946 -1.676 20 1996 -.421 20

1947 .129 20 1997 .746 20

1948 -.775 20 1998 1.120 20

1949 -.370 20 1999 -.022 20

PART 5: CORRELATION OF SERIES BY SEGMENTS: Camel's Hump-Low Corr1-30 14:41 Wed 17 Jan 2007 Page 5

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Correlations of 30-year dated segments, lagged 15 years

Flags: A = correlation under .4226 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1905 1920 1935 1950 1965 1980

1934 1949 1964 1979 1994 2009

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

1 161a 1919 2006 .83 .83 .85 .50 .40A .43

2 161b 1914 2006 .77 .78 .67B .16B .41A .42A

3 162a 1915 2006 .63 .79 .67 .29A .55 .72

4 162b 1912 2006 .79 .78 .60 .21B .24B .34A

5 163a 1919 2006 .89 .93 .94 .79 .66 .51

6 163b 1918 2006 .91 .92 .90 .67 .78 .71

7 164a 1924 2006 .92 .84 .57 .59 .47

8 164b 1918 2006 .76 .86 .84 .08B .28B .54

9 165a 1916 2006 .83 .89 .84 .46 .56 .65

10 165b 1914 2006 .70 .65 .49 .35A .52 .50

11 166a 1915 2006 .47 .84 .78 .56 .67 .71

12 166b 1917 2006 .80 .80 .76 .63 .69 .72

13 167a 1919 2006 .87 .87 .74 .39B .51 .56

14 167b 1918 2006 .90 .93 .83 .68 .62 .53

15 168a 1918 2006 .69 .70 .75 .24A .33B .36A

16 168b 1920 2006 .85 .90 .54 .59 .62

17 169a 1922 2006 .85 .87 .34A .32A .37A

18 169b 1919 2006 .91 .91 .84 .45 .47 .35A

19 170a 1921 2006 .88 .82 .36A .34B .40A

20 170b 1921 2006 .88 .80 .34B .16B .24B

Av segment correlation .78 .84 .79 .43 .48 .51

161a 1919 to 2006 88 years Series 1

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

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

1965 1994 0 -.08 -.18 -.45 -.10 -.04 -.13 -.04 -.21 .18 .26 .40\*-.04 -.08 -.05 .00 .27 -.18 -.21 -.15 -.17 .10

[B] Entire series, effect on correlation ( .704) is:

Lower 1974> -.013 1987< -.012 1979> -.010 1992> -.010 1936> -.010 1964< -.006 Higher 1945 .074 1925 .020

1965 to 1994 segment:

Lower 1974> -.054 1987< -.044 1992> -.043 1979> -.040 1972< -.025 1983> -.023 Higher 1985 .118 1968 .081

161a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 148

1920 150 148 210 187 237 84 139 271 264 258

1930 215 241 214 199 251 240 148 161 204 213

1940 227 215 196 225 190 38 101 142 85 97

1950 190 170 215 135 120 179 197 133 173 184

1960 191 154 159 188 160 167 125 158 119 111

1970 124 135 119 110 156 113 125 186 172 174

1980 103 122 125 129 93 48 46 42 76 69

1990 68 68 81 91 82 57 65 83 65 48

2000 41 54 28 35 51 71 75

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

161b 1914 to 2006 93 years Series 2

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

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

1935 1964 9 .03 .16 .09 -.22 -.14 -.35 -.22 -.11 -.25 -.03 .67| .02 -.13 -.15 -.06 -.22 -.08 -.15 .07 .71\* .01

1950 1979 -9 -.24 .26\* .25 -.15 -.01 -.18 -.08 -.08 -.08 -.05 .16|-.30 -.01 -.17 .10 -.35 .07 .11 .15 .11 -.07

1965 1994 0 -.21 .13 -.14 -.11 .28 .15 .18 .07 -.02 .20 .41\*-.33 -.05 -.03 -.19 -.39 -.14 .08 .00 -.16 .30

1977 2006 0 .14 .03 -.21 .00 .11 -.13 .17 .07 -.08 .27 .42\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .617) is:

Lower 1964< -.025 1977< -.023 1961< -.018 1932< -.010 1915> -.010 1921> -.008 Higher 1936 .062 1925 .040

1935 to 1964 segment:

Lower 1964< -.052 1961< -.038 1950> -.018 1962< -.014 1948> -.009 1944> -.007 Higher 1936 .130 1943 .014

1950 to 1979 segment:

Lower 1964< -.108 1977< -.088 1961< -.057 1972< -.025 1950> -.020 1966> -.018 Higher 1968 .073 1953 .066

1965 to 1994 segment:

Lower 1977< -.142 1972< -.044 1990< -.034 1993< -.031 1984> -.022 1981> -.017 Higher 1985 .128 1968 .049

1977 to 2006 segment:

Lower 1977< -.121 2004< -.032 2000> -.030 1984> -.028 1990< -.026 1993< -.024 Higher 1985 .123 1995 .046

161b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1914 47 97 128 131 164 184

1920 160 212 196 179 219 62 150 247 228 201

1930 214 233 143 145 196 175 28 120 186 210

1940 211 222 208 268 244 98 128 203 191 205

1950 268 198 235 154 131 172 194 167 167 146

1960 148 111 105 156 122 146 162 199 127 165

1970 175 145 101 87 107 126 118 79 141 140

1980 123 148 147 130 125 75 82 126 126 97

1990 81 117 112 98 167 100 90 142 250 189

2000 161 186 122 121 147 154 190

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

162a 1915 to 2006 92 years Series 3

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

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

1950 1979 0 -.13 .18 .15 -.22 .06 .09 .03 -.05 .00 .10 .29\*-.17 -.24 .05 -.19 .12 .11 -.24 .22 -.17 .26

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

Lower 1915> -.084 1963< -.026 1977< -.014 1971> -.011 1958< -.009 1945> -.007 Higher 1925 .047 1936 .037

1950 to 1979 segment:

Lower 1963< -.076 1977< -.056 1971> -.055 1958< -.039 1976> -.022 1966> -.020 Higher 1953 .052 1974 .050

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

1915 +5.2 SD

162a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1915 378 256 243 293 320

1920 351 233 233 259 316 141 253 402 355 286

1930 285 349 329 225 294 324 120 177 228 241

1940 274 271 266 333 191 59 85 153 96 143

1950 117 189 241 104 101 152 195 149 105 185

1960 121 128 135 83 155 131 130 134 104 143

1970 103 124 127 100 59 70 99 73 99 75

1980 76 96 77 63 40 24 41 64 72 48

1990 71 79 38 59 91 53 58 78 82 79

2000 38 39 32 39 84 78 38

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

162b 1912 to 2006 95 years Series 4

[\*] Early part of series cannot be checked from 1912 to 1913 -- 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

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

1950 1979 -5 -.26 .09 .20 -.06 .03 .46\* .08 .22 -.13 .08 .21|-.16 -.22 -.21 .02 -.20 .02 -.19 -.07 .08 .29

1965 1994 10 -.25 .00 .21 .05 .37 .11 .28 .23 -.20 .16 .24|-.39 -.11 -.37 -.15 .22 -.11 -.10 -.06 .07 .45\*

1977 2006 0 -.29 -.20 .04 -.10 .29 .13 .29 .07 -.37 .15 .34\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .538) is:

Lower 1945> -.031 1968> -.031 1950< -.023 1915> -.018 1918> -.010 1983> -.010 Higher 1936 .075 1925 .041

1950 to 1979 segment:

Lower 1968> -.186 1950< -.042 1971> -.039 1958< -.033 1973> -.022 1962< -.015 Higher 1953 .063 1974 .042

1965 to 1994 segment:

Lower 1968> -.147 1983> -.039 1971> -.028 1993< -.025 1987< -.025 1980< -.022 Higher 1994 .061 1982 .042

1977 to 2006 segment:

Lower 1983> -.057 1999> -.031 1985> -.029 1987< -.025 1993< -.024 1995> -.024 Higher 1994 .056 1982 .038

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

1945 +3.2 SD; 1968 +3.5 SD

162b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1912 214 205 146 185 204 159 284 296

1920 314 299 295 287 334 163 205 375 403 344

1930 302 365 286 281 345 320 75 127 247 296

1940 218 302 247 304 217 125 111 223 153 139

1950 90 154 188 123 140 170 157 124 119 169

1960 122 163 122 150 145 169 129 172 183 134

1970 136 145 133 112 57 52 56 91 106 43

1980 36 68 95 105 52 39 65 37 42 35

1990 31 50 36 27 55 45 33 47 43 46

2000 23 12 23 26 35 35 8

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163a 1919 to 2006 88 years Series 5

[B] Entire series, effect on correlation ( .759) is:

Lower 2002< -.025 1919< -.013 1981> -.009 2004< -.008 1979> -.007 2006> -.006 Higher 1945 .055 1925 .012

163a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 279

1920 372 409 434 348 429 306 226 391 454 469

1930 373 526 569 425 392 430 254 245 304 312

1940 357 391 350 396 287 108 133 236 206 172

1950 173 222 237 175 173 268 253 195 225 221

1960 195 165 182 176 207 162 109 138 78 86

1970 109 78 120 86 50 84 113 170 149 143

1980 83 145 159 112 61 53 91 83 98 81

1990 121 155 105 80 104 91 63 114 127 77

2000 35 65 36 43 51 56 64

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

163b 1918 to 2006 89 years Series 6

[B] Entire series, effect on correlation ( .822) is:

Lower 2006< -.013 1973> -.012 1961< -.011 1959< -.010 2004< -.009 1946> -.006 Higher 1945 .067 1936 .025

163b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1918 360 338

1920 395 411 417 359 435 311 268 355 361 319

1930 296 426 391 298 346 412 143 173 207 249

1940 267 271 246 220 168 25 116 173 121 143

1950 132 170 202 119 111 171 226 151 158 99

1960 119 95 171 161 186 145 111 108 55 92

1970 115 102 134 135 76 75 69 109 108 63

1980 101 101 108 89 54 25 64 84 108 78

1990 119 138 94 79 101 59 73 106 145 113

2000 45 53 42 41 42 34 12

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164a 1924 to 2006 83 years Series 7

[B] Entire series, effect on correlation ( .748) is:

Lower 1996< -.051 1974> -.020 1984> -.008 2001< -.007 1975< -.007 2000> -.007 Higher 1945 .063 1925 .027

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

1945 -4.515 20 1

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

1996 -4.6 SD

164a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 213 106 156 252 260 271

1930 214 283 240 206 231 234 68 116 202 261

1940 231 275 293 266 109 0 105 179 115 143

1950 229 178 220 145 217 239 248 198 236 163

1960 209 171 159 217 211 152 133 192 105 127

1970 130 120 121 117 157 93 103 129 111 98

1980 122 88 131 91 107 71 89 116 135 91

1990 90 90 79 75 82 53 37 75 74 93

2000 89 56 61 69 129 105 95

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164b 1918 to 2006 89 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

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

1950 1979 8 -.21 .00 .00 -.20 -.08 .04 -.17 .09 .10 .09 .08|-.08 .20 .28 .22 -.30 -.03 -.19 .47\* .26 .02

1965 1994 4 -.02 .03 -.02 -.28 -.14 -.17 -.11 -.01 .03 .19 .28|-.27 .03 .21 .38\*-.42 -.17 .02 .28 -.07 .14

[B] Entire series, effect on correlation ( .618) is:

Lower 1977< -.029 1968> -.027 1918< -.025 1925> -.017 1974> -.014 1919> -.013 Higher 1945 .143 1985 .016

1950 to 1979 segment:

Lower 1977< -.112 1968> -.086 1974> -.052 1967< -.025 1979> -.023 1965< -.021 Higher 1978 .056 1964 .056

1965 to 1994 segment:

Lower 1977< -.113 1968> -.110 1974> -.056 1979> -.024 1965< -.022 1967< -.020 Higher 1985 .161 1994 .064

164b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1918 87 223

1920 184 181 184 184 192 172 168 332 251 249

1930 188 305 255 223 257 237 112 137 141 183

1940 138 241 219 251 169 27 101 173 129 136

1950 182 185 215 167 252 198 244 199 186 172

1960 189 267 189 207 224 158 141 148 183 140

1970 152 127 150 127 179 147 103 78 193 172

1980 156 89 138 119 115 72 95 127 123 98

1990 160 156 127 118 159 100 147 139 114 94

2000 66 95 59 68 94 102 78

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165a 1916 to 2006 91 years Series 9

[B] Entire series, effect on correlation ( .667) is:

Lower 1967< -.024 1918> -.017 1998< -.013 1984< -.010 1966< -.010 1992> -.008 Higher 1945 .067 1925 .019

165a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 340 353 412 360

1920 361 321 424 338 386 281 271 350 392 388

1930 300 395 365 301 329 281 165 147 179 217

1940 295 271 243 254 160 48 129 195 148 130

1950 115 149 181 116 192 212 240 173 197 160

1960 157 212 215 177 154 173 97 68 94 104

1970 108 85 87 87 74 91 89 101 113 80

1980 85 96 122 109 58 33 88 98 106 91

1990 94 104 104 102 112 80 95 128 85 65

2000 69 58 66 57 85 71 56

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165b 1914 to 2006 93 years Series 10

[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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1950 1979 0 -.11 -.06 .18 -.07 -.10 -.02 .21 .12 -.18 -.17 .35\* .04 -.02 .06 -.08 .15 -.06 -.29 -.14 .12 -.03

[B] Entire series, effect on correlation ( .514) is:

Lower 1957< -.054 1998< -.033 1968> -.028 1948> -.017 1944< -.012 1941< -.012 Higher 1945 .050 1915 .023

1950 to 1979 segment:

Lower 1968> -.179 1957< -.081 1967< -.022 1978< -.021 1954> -.015 1963< -.005 Higher 1953 .049 1974 .036

165b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1914 236 226 263 293 343 328

1920 364 328 280 306 354 286 272 381 366 292

1930 250 309 300 240 273 289 191 200 210 283

1940 264 149 115 168 101 46 68 121 227 188

1950 162 196 225 133 198 204 251 114 176 238

1960 201 183 165 138 167 157 140 120 158 159

1970 138 91 94 84 62 66 74 158 114 80

1980 82 72 101 83 45 30 73 78 97 80

1990 104 94 86 90 134 93 128 105 35 25

2000 47 61 58 46 91 95 70

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166a 1915 to 2006 92 years Series 11

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

Lower 1915< -.150 1981< -.009 1945> -.009 1917> -.008 1916> -.007 1952< -.007 Higher 1936 .032 1985 .015

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

1915 1916 5.7 SD

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

1915 -8.8 SD; 1945 +3.0 SD

166a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1915 204 230 243 233 235

1920 280 254 262 219 280 186 200 317 366 260

1930 290 263 282 175 277 214 32 111 216 207

1940 235 293 324 266 170 35 75 138 74 87

1950 116 81 88 79 86 179 175 186 168 176

1960 128 120 154 152 193 187 140 146 97 158

1970 105 89 106 105 79 85 86 105 110 57

1980 75 47 78 89 82 45 80 85 102 69

1990 109 113 64 75 112 75 46 78 78 56

2000 36 51 39 52 85 67 58

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166b 1917 to 2006 90 years Series 12

[B] Entire series, effect on correlation ( .640) is:

Lower 1968< -.069 2002> -.010 1945> -.008 2006< -.008 1926> -.007 1923> -.006 Higher 1936 .023 1985 .012

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

2006 -.124 20 1 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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

1968 -6.6 SD

166b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1917 216 227 256

1920 301 246 269 353 401 257 293 399 446 381

1930 342 383 380 315 302 257 100 179 133 311

1940 256 250 264 231 159 47 71 136 67 100

1950 166 200 177 122 115 207 177 130 220 213

1960 158 127 196 159 179 164 122 140 46 109

1970 158 138 123 114 85 127 113 165 198 169

1980 144 102 147 81 73 51 78 99 128 76

1990 70 77 62 59 87 56 70 81 63 30

2000 19 26 42 37 41 25 0

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

167a 1919 to 2006 88 years Series 13

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

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1950 1979 -6 -.14 .29 .22 .02 .51\* .32 .13 .47 .05 .11 .39|-.31 -.03 .13 -.46 .13 -.02 -.15 -.10 -.33 -.28

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

Lower 1954< -.019 1946> -.019 1952< -.012 1987< -.011 1951< -.010 1948> -.009 Higher 1945 .110 1925 .028

1950 to 1979 segment:

Lower 1954< -.044 1952< -.043 1975> -.030 1951< -.026 1968> -.025 1963< -.019 Higher 1964 .065 1958 .040

167a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 286

1920 314 262 298 294 438 208 214 290 402 313

1930 235 321 343 216 288 297 145 236 217 251

1940 240 243 209 257 202 11 182 218 170 164

1950 90 59 92 87 48 134 155 148 219 189

1960 141 156 177 97 245 235 145 188 115 101

1970 101 80 89 65 65 98 64 69 63 36

1980 54 102 174 99 47 22 43 18 45 39

1990 106 92 67 80 148 70 81 135 243 118

2000 54 66 50 61 132 73 137

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167b 1918 to 2006 89 years Series 14

[B] Entire series, effect on correlation ( .741) is:

Lower 1989< -.018 2005< -.012 1951< -.010 1918< -.008 1952< -.008 1992> -.008 Higher 1945 .077 1925 .024

167b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1918 185 236

1920 275 263 270 220 279 161 187 299 417 306

1930 250 384 334 246 324 335 142 205 211 268

1940 313 277 297 292 169 6 123 176 137 141

1950 94 74 111 83 170 168 162 131 173 163

1960 135 151 148 177 280 140 118 107 33 115

1970 95 68 164 110 58 67 59 139 124 84

1980 72 65 90 100 73 37 79 61 171 44

1990 53 83 113 109 117 68 125 151 155 139

2000 102 126 72 99 146 72 83

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

168a 1918 to 2006 89 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

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

1950 1979 0 -.05 .22 -.02 -.32 .08 -.05 -.03 .09 -.07 -.28 .24\*-.45 .02 -.07 .05 .01 .22 -.01 .00 -.11 -.25

1965 1994 -9 -.06 .34\* .22 .26 -.07 -.03 -.10 .02 -.22 -.33 .33|-.19 .07 .18 .06 -.22 .02 .06 .12 -.19 -.02

1977 2006 0 .01 .07 .27 .34 -.16 -.04 -.02 .04 -.38 -.28 .36\* - - - - - - - - - -

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

Lower 1925> -.036 1992< -.033 1920< -.016 1964< -.012 2002> -.011 1976> -.010 Higher 1936 .074 1945 .025

1950 to 1979 segment:

Lower 1964< -.073 1976> -.047 1973> -.044 1955< -.041 1975> -.036 1977< -.026 Higher 1968 .148 1952 .058

1965 to 1994 segment:

Lower 1994< -.030 1973> -.029 1976> -.028 1992< -.022 1975> -.021 1981< -.019 Higher 1968 .051 1991 .040

1977 to 2006 segment:

Lower 2002> -.049 1994< -.021 1985> -.020 2001> -.013 1981< -.012 1977< -.010 Higher 2004 .039 1991 .035

168a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1918 242 241

1920 227 278 271 332 363 301 211 330 337 329

1930 354 392 353 205 227 246 41 101 171 215

1940 162 199 204 266 122 9 32 36 23 24

1950 40 38 110 39 44 27 32 13 71 51

1960 29 28 16 25 24 81 37 68 23 91

1970 58 58 44 67 49 70 73 46 68 41

1980 61 26 57 22 33 37 61 76 73 43

1990 65 132 15 45 50 50 60 58 64 51

2000 45 101 97 57 123 102 10

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

168b 1920 to 2006 87 years Series 16

[B] Entire series, effect on correlation ( .740) is:

Lower 1925> -.031 1973> -.017 1971> -.013 1983< -.010 1920< -.010 2000> -.009 Higher 1945 .074 1936 .033

168b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1920 230 237 241 236 288 229 174 305 223 277

1930 261 394 357 239 356 268 54 94 194 256

1940 195 168 167 226 127 15 41 96 53 84

1950 86 49 108 32 42 60 67 53 53 64

1960 74 43 31 37 70 29 38 58 13 53

1970 53 59 54 60 20 22 20 28 49 19

1980 44 40 58 17 34 25 64 66 66 60

1990 94 81 32 117 96 38 86 92 142 47

2000 103 105 70 57 123 67 102

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

169a 1922 to 2006 85 years Series 17

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

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

1950 1979 0 -.14 .20 .08 -.27 .06 -.16 -.51 .30 -.45 .13 .34\*-.22 .19 -.05 .13 .31 .17 -.10 .07 -.03 .07

1965 1994 0 .01 -.12 -.11 -.39 .08 .27 -.07 .12 -.43 .05 .32\*-.20 .17 -.12 .02 .22 .24 -.19 -.21 -.20 .17

1977 2006 0 .24 -.24 -.18 -.19 .04 .31 .29 -.29 -.46 -.08 .37\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .643) is:

Lower 1925> -.023 1969< -.015 1985> -.015 1992> -.014 1971< -.014 1990< -.012 Higher 1945 .116 1936 .061

1950 to 1979 segment:

Lower 1969< -.052 1957> -.043 1950> -.020 1974> -.019 1973> -.019 1959< -.017 Higher 1952 .037 1977 .025

1965 to 1994 segment:

Lower 1969< -.050 1992> -.047 1985> -.041 1990< -.040 1974> -.016 1973> -.015 Higher 1982 .039 1989 .035

1977 to 2006 segment:

Lower 1992> -.056 1985> -.049 1990< -.043 2003> -.038 2002> -.035 1996< -.018 Higher 2004 .045 1989 .041

169a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 216 181 190 159 84 258 224 249

1930 214 241 178 127 148 141 47 105 129 130

1940 115 127 109 127 116 15 47 76 67 109

1950 181 132 192 116 70 138 139 171 152 103

1960 99 130 131 118 134 138 95 111 102 76

1970 154 69 139 127 125 113 104 182 157 78

1980 114 95 135 103 79 85 86 116 119 44

1990 40 78 105 88 84 68 32 63 99 51

2000 47 60 87 110 124 74 87

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

169b 1919 to 2006 88 years Series 18

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

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

1977 2006 0 .31 -.23 -.25 .24 -.05 .09 -.01 -.17 -.29 -.09 .35\* - - - - - - - - - -

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

Lower 1997< -.019 1987> -.014 1984> -.011 1954< -.010 1953> -.009 1983< -.009 Higher 1945 .090 1936 .046

1977 to 2006 segment:

Lower 1997< -.076 1984> -.044 1987> -.037 1978< -.022 1990< -.020 1989> -.016 Higher 2004 .060 1994 .051

169b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 168

1920 185 178 199 230 327 175 124 259 249 225

1930 207 259 230 238 235 155 29 70 153 161

1940 119 111 127 147 112 5 33 74 68 70

1950 121 173 89 81 52 114 164 93 106 102

1960 145 135 133 95 149 110 110 131 72 63

1970 79 91 128 70 64 71 74 80 78 83

1980 85 70 99 65 88 77 68 131 104 75

1990 57 99 75 101 121 66 60 47 95 54

2000 54 58 71 74 122 87 27

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

170a 1921 to 2006 86 years Series 19

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

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

1950 1979 0 -.17 -.18 .07 -.07 -.33 .12 -.42 -.03 .06 -.27 .36\* .12 -.25 .23 -.08 -.15 .16 -.25 .07 .09 .16

1965 1994 -5 -.17 -.41 -.03 .19 -.23 .40\*-.34 .16 .26 -.14 .34| .16 -.17 .06 -.14 .01 -.17 -.31 .00 -.16 .16

1977 2006 0 -.02 -.49 -.08 .18 -.20 -.06 -.17 .07 -.04 .08 .40\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .657) is:

Lower 1973< -.036 1988< -.012 1985> -.010 1989> -.010 1953> -.009 1966> -.008 Higher 1945 .131 1936 .015

1950 to 1979 segment:

Lower 1953> -.035 1966> -.028 1979> -.025 1964< -.016 1962< -.016 1960< -.012 Higher 1955 .030 1952 .026

1965 to 1994 segment:

Lower 1988< -.050 1973< -.041 1989> -.031 1966> -.021 1979> -.018 1985> -.018 Higher 1994 .030 1977 .026

1977 to 2006 segment:

Lower 1988< -.064 1989> -.043 1997< -.038 1979> -.029 1985> -.018 1991< -.018 Higher 2004 .061 1994 .033

170a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 181 201 164 234 163 194 265 201 202

1930 183 211 246 206 202 212 91 96 122 180

1940 145 138 126 121 98 12 55 83 73 99

1950 113 144 140 106 122 136 100 72 95 80

1960 67 93 72 95 87 79 98 96 75 82

1970 83 74 110 47 73 66 57 98 85 86

1980 74 75 79 61 55 54 58 45 42 62

1990 46 49 37 86 72 40 32 38 67 56

2000 40 46 52 31 82 55 67

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

170b 1921 to 2006 86 years Series 20

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

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

1950 1979 3 -.29 -.23 -.04 -.08 .01 .18 -.17 .09 .07 -.10 .34| .26 .04 .39\* .02 -.23 .00 -.36 .15 .24 .01

1965 1994 -7 -.07 -.19 -.19 .38\*-.23 .34 -.10 -.07 -.12 -.14 .16| .04 -.09 .28 .02 -.14 -.12 -.18 -.15 .22 .28

1977 2006 -7 .18 -.17 -.09 .42\*-.06 .15 -.12 -.20 -.40 -.09 .24| - - - - - - - - - -

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

Lower 1985> -.026 1968> -.022 1997< -.016 2002> -.012 1984> -.012 1972< -.012 Higher 1945 .112 1925 .033

1950 to 1979 segment:

Lower 1968> -.115 1974> -.047 1972< -.045 1957> -.034 1979> -.031 1967< -.016 Higher 1973 .046 1955 .043

1965 to 1994 segment:

Lower 1985> -.072 1968> -.066 1984> -.037 1972< -.036 1974> -.031 1990< -.025 Higher 1982 .047 1992 .046

1977 to 2006 segment:

Lower 1985> -.073 1997< -.061 1984> -.037 2002> -.037 1990< -.030 1979> -.020 Higher 2004 .075 1992 .050

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

1985 +3.4 SD

170b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 192 248 176 226 153 164 296 223 204

1930 192 233 194 189 253 213 96 97 141 165

1940 124 117 120 185 115 10 62 128 61 77

1950 122 66 112 78 99 151 114 99 104 81

1960 69 135 82 73 110 74 65 81 88 80

1970 72 63 64 56 88 62 56 118 81 79

1980 76 82 96 59 93 91 67 115 95 68

1990 53 89 41 67 84 43 32 53 87 60

2000 49 67 78 57 102 55 48

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

PART 7: DESCRIPTIVE STATISTICS: Camel's Hump-Low Corr1-30 14:41 Wed 17 Jan 2007 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 161a 1919 2006 88 6 1 .704 1.39 2.71 .631 .768 .234 2.38 .364 -.018 2

2 161b 1914 2006 93 6 4 .617 1.54 2.68 .501 .510 .257 2.51 .390 .004 2

3 162a 1915 2006 92 6 1 .575 1.54 4.02 .994 .822 .301 2.45 .419 .037 2

4 162b 1912 2006 95 6 3 .538 1.52 4.03 1.028 .853 .294 2.41 .410 .008 2

5 163a 1919 2006 88 6 0 .759 2.01 5.69 1.315 .897 .261 2.52 .498 .030 2

6 163b 1918 2006 89 6 0 .822 1.67 4.35 1.134 .882 .289 2.44 .384 -.031 2

7 164a 1924 2006 83 5 0 .748 1.49 2.93 .688 .716 .300 2.59 .497 .067 1

8 164b 1918 2006 89 6 2 .618 1.61 3.32 .584 .591 .262 2.53 .378 .039 1

9 165a 1916 2006 91 6 0 .667 1.75 4.24 1.074 .912 .216 2.60 .479 .063 2

10 165b 1914 2006 93 6 1 .514 1.66 3.81 .939 .885 .251 2.69 .453 .082 2

11 166a 1915 2006 92 6 0 .536 1.44 3.66 .823 .820 .289 2.28 .291 -.034 1

12 166b 1917 2006 90 6 0 .640 1.63 4.46 1.038 .870 .312 2.38 .335 -.025 2

13 167a 1919 2006 88 6 1 .721 1.55 4.38 .956 .743 .383 2.55 .367 -.045 2

14 167b 1918 2006 89 6 0 .741 1.58 4.17 .886 .746 .354 2.73 .443 -.020 2

15 168a 1918 2006 89 6 3 .489 1.11 3.92 1.050 .879 .440 2.77 .455 -.010 1

16 168b 1920 2006 87 5 0 .740 1.09 3.94 .922 .822 .441 2.48 .459 .054 1

17 169a 1922 2006 85 5 3 .643 1.17 2.58 .497 .594 .319 2.53 .432 .009 1

18 169b 1919 2006 88 6 1 .695 1.15 3.27 .615 .727 .323 2.65 .446 .033 2

19 170a 1921 2006 86 5 3 .657 1.02 2.65 .568 .845 .258 2.49 .380 .014 1

20 170b 1921 2006 86 5 3 .628 1.07 2.96 .576 .728 .332 2.59 .449 .089 3

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

Total or mean: 1781 115 26 .651 1.45 5.69 .844 .781 .305 2.77 .416 .017

- = [ COFECHA CH\_L COF ] = -