[] Dendrochronology Program Library Run M1F1 Program COF 16:42 Mon 09 Jan 2012 Page 1

[]

[] P R O G R A M C O F E C H A Version 6.06P 28134

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

QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: MIC001\_FAGR\_Corr1-40

File of DATED series: MIC001\_FAGR\_Compact\_Corr1

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 40 years lagged successively by 20 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 .3665

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 1932 to 2011 80 years

Continuous time span is 1932 to 2011 80 years

Portion with two or more series is 1933 to 2011 79 years

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

\*C\* Number of dated series 16 \*C\*

\*O\* Master series 1932 2011 80 yrs \*O\*

\*F\* Total rings in all series 1017 \*F\*

\*E\* Total dated rings checked 1016 \*E\*

\*C\* Series intercorrelation .680 \*C\*

\*H\* Average mean sensitivity .234 \*H\*

\*A\* Segments, possible problems 10 \*A\*

\*\*\* Mean length of series 63.6 \*\*\*

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

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

3a 1 absent rings: 1984

3b 1 absent rings: 1984

2 absent rings .197%

PART 2: TIME PLOT OF TREE-RING SERIES: MIC001\_FAGR\_Corr1-40 16:42 Mon 09 Jan 2012 Page 2

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

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

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

. . . . . . . . . . . . . . . . . . <=====> . 1a 1 1953 2011 59

. . . . . . . . . . . . . . . . . . <======> . 1b 2 1948 2011 64

. . . . . . . . . . . . . . . . . . . <===> . 2a 3 1973 2011 39

. . . . . . . . . . . . . . . . . . <=====> . 2b 4 1954 2011 58

. . . . . . . . . . . . . . . . . . <=======> . 3a 5 1932 2011 80

. . . . . . . . . . . . . . . . . . <=======> . 3b 6 1933 2011 79

. . . . . . . . . . . . . . . . . . <=====> . 4a 7 1950 2011 62

. . . . . . . . . . . . . . . . . . <======> . 4b 8 1949 2011 63

. . . . . . . . . . . . . . . . . . <======> . 5a 9 1949 2011 63

. . . . . . . . . . . . . . . . . . <======> . 5b 10 1948 2011 64

. . . . . . . . . . . . . . . . . . <=====> . 6a 11 1951 2011 61

. . . . . . . . . . . . . . . . . . <=====> . 6b 12 1952 2011 60

. . . . . . . . . . . . . . . . . . <======> . 18a 13 1948 2011 64

. . . . . . . . . . . . . . . . . . <======> . 18b 14 1944 2011 68

. . . . . . . . . . . . . . . . . . <=====> . 19a 15 1950 2011 62

. . . . . . . . . . . . . . . . . . <======> . 19b 16 1941 2011 71

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

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

1950 .575 11 2000 -.871 16

1951 .559 12 2001 .951 16

1952 .787 13 2002 .867 16

1953 .425 14 2003 .339 16

1954 .428 15 2004 1.353 16

1955 .293 15 2005 .236 16

1956 .838 15 2006 -1.813 16

1957 -5.226 15 2007 .264 16

1958 -.210 15 2008 .625 16

1959 .258 15 2009 1.079 16

1960 -.544 15 2010 .166 16

1961 .639 15 2011 -2.573 16

1962 -.562 15

1963 -.590 15

1964 1.007 15

1965 1.155 15

1966 .059 15

1967 .249 15

1968 -.405 15

1969 -.163 15

1970 .271 15

1971 -.294 15

1972 -.033 15

1973 -1.237 16

1974 -.572 16

1975 .090 16

1976 .649 16

1977 .519 16

1978 .465 16

1979 .540 16

1980 -.262 16

1981 -.873 16

1932 .531 1 1982 .508 16

1933 1.587 2 1983 -.755 16

1934 1.613 2 1984 -1.593 16 2

1935 .773 2 1985 -.450 16

1936 .461 2 1986 -.259 16

1937 -.587 2 1987 .120 16

1938 -.364 2 1988 1.318 16

1939 -.218 2 1989 -.578 16

1940 -.288 2 1990 .001 16

1941 .548 3 1991 .450 16

1942 -.389 3 1992 .492 16

1943 -1.108 3 1993 .536 16

1944 -2.033 4 1994 .038 16

1945 -.746 4 1995 -.745 16

1946 -.922 4 1996 -1.324 16

1947 1.435 4 1997 .405 16

1948 .667 7 1998 .339 16

1949 .526 9 1999 .553 16

PART 5: CORRELATION OF SERIES BY SEGMENTS: MIC001\_FAGR\_Corr1-40 16:42 Mon 09 Jan 2012 Page 5

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

Correlations of 40-year dated segments, lagged 20 years

Flags: A = correlation under .3665 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1920 1940 1960 1980

1959 1979 1999 2019

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

1 1a 1953 2011 .84 .65 .76

2 1b 1948 2011 .88 .55 .67

3 2a 1973 2011 .71

4 2b 1954 2011 .79 .60 .73

5 3a 1932 2011 .34A .33A .18B .57

6 3b 1933 2011 .76 .76 .36A .47

7 4a 1950 2011 .52 .63 .78

8 4b 1949 2011 .31B .66 .66

9 5a 1949 2011 .87 .38B .55

10 5b 1948 2011 .85 .46 .55

11 6a 1951 2011 .86 .48 .46

12 6b 1952 2011 .82 .32A .49

13 18a 1948 2011 .39B .32B .74

14 18b 1944 2011 .61 .30B .66

15 19a 1950 2011 .87 .59 .69

16 19b 1941 2011 .78 .45 .59

Av segment correlation .55 .70 .48 .62

PART 6: POTENTIAL PROBLEMS: MIC001\_FAGR\_Corr1-40 16:42 Mon 09 Jan 2012 Page 5

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

For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 40-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

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

1a 1953 to 2011 59 years Series 1

[B] Entire series, effect on correlation ( .833) is:

Lower 1968> -.018 1984< -.017 1963< -.011 1990< -.010 1953> -.006 1964< -.006 Higher 1957 .157 2004 .004

1a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1953 229 219 187 194 51 141 162

1960 142 190 157 104 140 173 171 165 184 164

1970 166 118 137 98 111 112 125 134 140 126

1980 100 106 129 103 66 104 143 163 232 125

1990 117 166 195 170 182 146 159 210 210 212

2000 154 241 222 207 257 219 152 202 187 174

2010 117 71

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

1b 1948 to 2011 64 years Series

[B] Entire series, effect on correlation ( .812) is:

Lower 1989< -.016 1990< -.014 2011> -.012 1968> -.011 1996> -.010 1966> -.008 Higher 1957 .201 2006 .004

1b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1948 202 156

1950 158 181 164 165 177 124 179 36 124 140

1960 115 136 111 118 145 170 170 180 165 146

1970 145 119 126 92 96 118 146 115 116 128

1980 118 125 165 122 129 149 151 189 225 97

1990 118 168 201 213 208 182 197 201 208 187

2000 149 213 189 176 191 145 114 204 201 245

2010 183 97

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

2a 1973 to 2011 39 years Series 3

[B] Entire series, effect on correlation ( .706) is:

Lower 1989> -.038 1996> -.024 1973> -.016 1974> -.015 1982< -.015 1985< -.013 Higher 2011 .141 2000 .012

2a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1973 73 102 101 123 140 153 154

1980 127 122 125 74 64 84 180 263 335 324

1990 368 363 301 293 287 246 278 285 278 289

2000 247 302 356 325 345 258 200 279 311 346

2010 318 138

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

2b 1954 to 2011 58 years Series 4

[B] Entire series, effect on correlation ( .774) is:

Lower 2005< -.033 1996> -.019 1963> -.008 1968> -.007 1982< -.007 1999< -.006 Higher 1957 .076 2011 .027

2b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1954 143 94 83 15 55 76

1960 75 119 110 134 173 174 153 167 155 140

1970 119 93 88 67 64 74 101 122 117 117

1980 102 120 126 101 86 122 183 189 267 198

1990 235 269 272 255 222 192 236 270 255 219

2000 183 245 240 243 289 185 125 179 200 236

2010 180 81

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

3a 1932 to 2011 80 years Series 5

[\*] Early part of series cannot be checked from 1932 to 1932 -- 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

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

1933 1972 0 - - - - - - - - - -.06 .34\*-.08 .03 -.16 -.02 -.03 .03 .03 -.07 -.07 -.55

1940 1979 0 - - -.28 .03 -.20 .14 -.05 -.06 .05 -.15 .33\*-.11 -.01 -.11 -.04 -.14 .04 .04 -.06 -.03 -.43

1960 1999 -5 .07 .02 -.28 -.10 -.18 .23\*-.07 .00 -.03 -.15 .18|-.05 .05 .02 .07 -.18 .15 .09 -.07 .02 -.02

[B] Entire series, effect on correlation ( .422) is:

Lower 1957> -.052 1946< -.046 1987< -.025 1977< -.017 1996> -.015 1963> -.014 Higher 2011 .065 2006 .025

1933 to 1972 segment:

Lower 1946< -.125 1938< -.027 1963> -.026 1936> -.017 1949< -.011 1940< -.010 Higher 1957 .051 1933 .030

1940 to 1979 segment:

Lower 1946< -.103 1977< -.036 1963> -.027 1942> -.009 1949< -.008 1940< -.008 Higher 1973 .028 1944 .026

1960 to 1999 segment:

Lower 1987< -.063 1996> -.049 1989> -.048 1977< -.044 1963> -.042 1982< -.014 Higher 1984 .118 1973 .061

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

1984 -1.593 16 2

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

1946 -4.7 SD; 1957 +4.4 SD

3a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1932 17 40 48 38 54 28 22 48

1940 39 63 78 77 38 81 11 302 161 108

1950 134 137 183 176 198 156 177 123 221 205

1960 171 231 134 230 213 224 139 107 117 109

1970 86 90 97 49 49 60 69 30 39 40

1980 39 44 44 49 0 37 45 12 88 130

1990 165 203 196 197 167 176 239 236 257 234

2000 172 189 188 171 232 175 121 183 169 177

2010 141 99

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

3b 1933 to 2011 79 years Series 6

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

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

1960 1999 0 -.06 .03 -.23 -.23 -.17 .30 -.19 .16 .07 -.24 .36\* .03 -.11 .18 -.04 -.15 .07 -.01 -.09 .03 -.03

[B] Entire series, effect on correlation ( .659) is:

Lower 1977< -.027 1989> -.020 1946> -.017 1938> -.015 1963> -.015 1996> -.014 Higher 1957 .179 2011 .015

1960 to 1999 segment:

Lower 1989> -.079 1977< -.069 1996> -.051 1963> -.046 1982< -.017 1970< -.014 Higher 1984 .073 1973 .062

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

1984 -1.593 16 2

3b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1933 40 56 44 27 24 55 41

1940 61 60 36 33 35 88 128 180 169 179

1950 195 206 189 167 180 160 200 97 199 223

1960 160 233 139 225 295 294 209 166 128 108

1970 79 87 105 49 45 45 58 23 32 43

1980 28 34 34 41 0 31 21 19 74 126

1990 184 205 235 211 193 151 208 199 215 244

2000 189 214 260 223 242 180 158 226 203 164

2010 130 95

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

4a 1950 to 2011 62 years Series 7

[B] Entire series, effect on correlation ( .601) is:

Lower 1957> -.093 1953> -.021 1995> -.019 1959< -.016 2005> -.010 1977> -.007 Higher 2011 .050 1973 .009

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

1953 +3.0 SD; 1957 +3.7 SD

4a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1950 370 355 385 486 331 346 307 188 238 161

1960 125 169 133 136 180 154 125 96 60 81

1970 70 66 71 53 90 104 116 170 150 166

1980 115 91 147 104 106 165 128 134 160 123

1990 148 162 177 205 186 237 179 245 210 252

2000 184 303 311 256 296 298 139 266 261 281

2010 246 112

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

4b 1949 to 2011 63 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

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

1949 1988 4 .01 .07 -.06 -.13 -.26 .12 -.10 .00 .12 -.18 .31| .05 -.14 -.14 .55\*-.20 -.07 -.06 -.16 .11 .11

[B] Entire series, effect on correlation ( .399) is:

Lower 1953< -.136 1957> -.048 1959< -.012 2000> -.010 1986> -.008 1963> -.006 Higher 2011 .038 1973 .017

1949 to 1988 segment:

Lower 1953< -.171 1957> -.061 1959< -.015 1986> -.010 1963> -.007 1956< -.005 Higher 1973 .029 1988 .017

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

1957 +4.5 SD

4b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1949 325

1950 342 361 401 178 226 337 273 156 173 130

1960 108 128 109 134 170 152 113 100 71 90

1970 98 82 89 70 100 128 149 169 159 160

1980 156 131 160 159 151 162 232 262 274 206

1990 228 224 237 267 221 172 182 225 263 254

2000 275 378 373 368 355 260 208 272 288 282

2010 217 134

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

5a 1949 to 2011 63 years Series 9

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

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

1960 1999 -6 -.08 .00 -.19 -.28 .40\* .07 -.06 .17 .07 -.04 .38|-.23 -.35 .08 -.26 .02 .04 -.05 .15 .14 .21

[B] Entire series, effect on correlation ( .804) is:

Lower 1986< -.032 1994> -.012 2005> -.008 1961< -.008 1984> -.008 2011> -.007 Higher 1957 .251 1964 .003

1960 to 1999 segment:

Lower 1986< -.110 1994> -.041 1961< -.028 1984> -.017 1998< -.012 1987< -.010 Higher 1989 .053 1964 .041

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

1957 -5.0 SD

5a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1949 195

1950 222 225 206 169 167 149 147 21 132 147

1960 131 119 121 103 157 162 125 120 123 156

1970 178 151 130 122 142 154 186 191 192 206

1980 187 169 243 166 171 255 51 111 272 153

1990 151 192 255 354 395 255 211 230 208 239

2000 208 262 255 229 260 260 157 206 197 237

2010 162 86

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

5b 1948 to 2011 64 years Series 10

[B] Entire series, effect on correlation ( .762) is:

Lower 2011> -.028 1989> -.026 1968< -.020 2007< -.014 2000> -.010 1962> -.010 Higher 1957 .278 2006 .008

5b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1948 148 183

1950 158 133 146 136 130 151 185 26 155 195

1960 151 150 153 142 171 188 156 138 82 103

1970 147 137 141 117 141 147 160 140 145 174

1980 150 114 207 160 156 167 220 224 266 228

1990 196 177 146 129 131 111 84 144 116 162

2000 133 148 139 91 112 96 34 44 90 106

2010 57 31

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

6a 1951 to 2011 61 years Series 11

[B] Entire series, effect on correlation ( .771) is:

Lower 2011> -.032 1992< -.011 2003< -.011 1974< -.010 1980> -.009 1983> -.009 Higher 1957 .286 2009 .003

6a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1951 278 299 328 284 278 303 67 243 274

1960 238 248 190 236 272 258 206 221 208 222

1970 272 255 237 204 181 207 217 217 218 220

1980 232 204 268 209 183 191 196 170 173 116

1990 141 135 119 125 124 118 96 131 132 128

2000 111 139 112 76 140 125 79 98 140 209

2010 152 89

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

6b 1952 to 2011 60 years Series 12

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

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

1960 1999 0 -.03 .17 -.14 -.14 .07 .10 -.24 -.05 -.20 .04 .32\*-.12 -.08 -.03 .06 .10 .02 -.18 -.14 -.14 .07

[B] Entire series, effect on correlation ( .775) is:

Lower 1984> -.023 1992< -.019 1993< -.017 1980> -.013 1974< -.013 1976< -.008 Higher 1957 .252 2011 .019

1960 to 1999 segment:

Lower 1984> -.076 1992< -.048 1993< -.045 1980> -.040 1983> -.022 1976< -.020 Higher 1988 .055 1962 .032

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

1984 +3.2 SD

6b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1952 282 246 241 262 320 86 269 334

1960 258 278 205 251 263 287 220 244 208 206

1970 240 248 227 224 200 230 232 271 270 277

1980 304 230 298 268 288 249 283 282 301 220

1990 212 218 161 150 153 135 151 188 213 198

2000 168 188 180 130 181 152 106 118 144 132

2010 102 18

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

18a 1948 to 2011 64 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

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

1948 1987 -6 -.12 -.01 -.05 -.12 .58\* .00 -.15 .13 -.10 -.05 .39|-.23 -.09 .05 .00 .07 .04 -.15 -.17 .03 .22

1960 1999 -6 -.10 -.01 -.07 -.17 .72\* .13 -.15 .14 -.22 -.05 .32|-.29 -.20 -.05 -.16 .16 .05 -.03 .02 -.11 .30

[B] Entire series, effect on correlation ( .508) is:

Lower 1963< -.188 1988< -.010 1973> -.006 1974> -.004 1968> -.004 1953< -.004 Higher 2011 .036 1957 .025

1948 to 1987 segment:

Lower 1963< -.303 1973> -.006 1974> -.005 1953< -.005 1968> -.004 1964< -.003 Higher 1957 .152 1984 .013

1960 to 1999 segment:

Lower 1963< -.233 1988< -.030 1973> -.022 1968> -.011 1964< -.011 1974> -.009 Higher 1989 .081 1984 .028

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

1962 1963 -4.4 SD

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

1957 +3.1 SD; 1963 -8.4 SD

18a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1948 427 520

1950 462 369 340 253 265 263 271 143 218 229

1960 192 229 138 22 115 148 162 200 190 196

1970 213 163 185 175 215 224 198 228 223 216

1980 202 176 199 151 118 181 175 156 153 66

1990 134 202 230 242 222 156 166 245 220 229

2000 156 224 199 172 212 167 101 155 160 197

2010 176 82

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

18b 1944 to 2011 68 years Series 14

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

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

1960 1999 -3 -.03 .30 .01 -.09 .02 .17 -.31 .53\*-.26 -.30 .30|-.16 .06 .07 -.04 -.08 .07 -.04 .07 -.06 .00

[B] Entire series, effect on correlation ( .625) is:

Lower 1989> -.031 1960< -.023 2000< -.020 1965< -.017 1946> -.013 1968> -.008 Higher 2011 .049 1957 .037

1960 to 1999 segment:

Lower 1989> -.112 1965< -.057 1968> -.027 1979< -.020 1974> -.014 1977< -.013 Higher 1988 .055 1962 .039

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

1989 +3.5 SD

18b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1944 36 97 213 347 326 298

1950 228 248 285 281 242 233 193 120 171 173

1960 120 178 140 135 148 127 109 126 142 148

1970 167 146 146 127 156 162 158 128 132 117

1980 103 114 150 129 107 173 264 347 430 443

1990 358 280 269 261 254 226 217 247 238 237

2000 165 235 234 256 257 207 166 206 203 223

2010 243 118

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

19a 1950 to 2011 62 years Series 15

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

Lower 1996< -.035 1960> -.012 1986< -.009 1958< -.009 1973> -.006 1977> -.006 Higher 1957 .178 2006 .005

19a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1950 199 201 164 155 122 104 169 16 62 81

1960 121 137 95 102 142 124 83 99 83 81

1970 85 83 96 91 105 123 141 156 132 123

1980 80 82 116 85 65 96 70 90 112 92

1990 107 109 107 107 78 74 44 81 84 107

2000 91 107 105 103 143 117 81 126 128 125

2010 107 77

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

19b 1941 to 2011 71 years Series 16

[B] Entire series, effect on correlation ( .713) is:

Lower 1996< -.055 1947< -.025 1986< -.012 1960> -.011 1973> -.009 1969< -.009 Higher 1957 .216 2011 .017

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

1996 -6.0 SD

19b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1941 33 27 16 13 15 48 56 66 92

1950 160 149 157 175 173 146 212 23 124 208

1960 217 222 185 156 196 195 142 157 133 111

1970 121 118 137 137 143 159 149 153 131 130

1980 109 87 114 100 90 102 80 110 115 89

1990 83 87 109 107 93 90 61 99 98 108

2000 97 114 107 114 127 117 83 93 102 120

2010 109 51

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

PART 7: DESCRIPTIVE STATISTICS: MIC001\_FAGR\_Corr1-40 16:42 Mon 09 Jan 2012 Page 6

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

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 1a 1953 2011 59 3 0 .833 1.57 2.57 .457 .549 .222 2.49 .371 .007 1

2 1b 1948 2011 64 3 0 .812 1.55 2.45 .396 .454 .203 2.33 .335 -.039 1

3 2a 1973 2011 39 1 0 .706 2.30 3.68 .977 .859 .177 2.36 .450 .041 2

4 2b 1954 2011 58 3 0 .774 1.57 2.89 .684 .842 .225 2.62 .500 .026 2

5 3a 1932 2011 80 4 3 .422 1.23 3.02 .743 .749 .357 2.91 .489 -.012 1

6 3b 1933 2011 79 4 1 .659 1.31 2.95 .803 .876 .314 2.48 .398 -.097 1

7 4a 1950 2011 62 3 0 .601 1.89 4.86 .934 .814 .235 2.69 .520 -.100 1

8 4b 1949 2011 63 3 1 .399 2.04 4.01 .874 .832 .176 2.45 .404 -.083 2

9 5a 1949 2011 63 3 1 .804 1.83 3.95 .636 .558 .248 2.25 .291 -.040 2

10 5b 1948 2011 64 3 0 .762 1.41 2.66 .460 .595 .250 2.31 .316 -.065 1

11 6a 1951 2011 61 3 0 .771 1.89 3.28 .658 .706 .190 2.46 .312 -.053 1

12 6b 1952 2011 60 3 1 .775 2.17 3.34 .646 .627 .190 2.30 .336 -.073 1

13 18a 1948 2011 64 3 2 .508 2.03 5.20 .819 .791 .245 2.39 .365 .075 1

14 18b 1944 2011 68 3 1 .625 2.01 4.43 .800 .826 .182 2.42 .452 -.073 1

15 19a 1950 2011 62 3 0 .822 1.06 2.01 .329 .500 .235 2.37 .352 -.026 1

16 19b 1941 2011 71 3 0 .713 1.15 2.22 .482 .721 .216 2.37 .358 -.043 1

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

Total or mean: 1017 48 10 .680 1.66 5.20 .664 .707 .234 2.91 .391 -.037

- = [ COFECHA M1F1 COF ] = -