[] Dendrochronology Program Library Run 5 Program COF 18:24 Fri 11 Mar 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27830

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 QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

 File of DATED series: 182\_BNT

 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 No AR modeling N

 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 N

 8 Parts printed 1234567

 9 Absent rings are omitted from master series and segment correlations (Y)

 Time span of Master dating series is 1920 to 2010 91 years

 Continuous time span is 1920 to 2010 91 years

 Portion with two or more series is 1921 to 2010 90 years

 >> 378A 2010 absent in 1 of 20 series, but is not usually narrow: master index is 1.556

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

 \*C\* Number of dated series 20 \*C\*

 \*O\* Master series 1920 2010 91 yrs \*O\*

 \*F\* Total rings in all series 1197 \*F\*

 \*E\* Total dated rings checked 1196 \*E\*

 \*C\* Series intercorrelation .603 \*C\*

 \*H\* Average mean sensitivity .241 \*H\*

 \*A\* Segments, possible problems 6 \*A\*

 \*\*\* Mean length of series 59.8 \*\*\*

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

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

 378A 1 absent rings: 2010

 1 absent rings .084%

PART 2: TIME PLOT OF TREE-RING SERIES: 18:24 Fri 11 Mar 2011 Page 2

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

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

 . . . . . . . . . . . . . . . . . . .<====> . 372A 1 1969 2010 42

 . . . . . . . . . . . . . . . . . . .<====> . 372B 2 1963 2010 48

 . . . . . . . . . . . . . . . . . . <=====> . 373A 3 1952 2010 59

 . . . . . . . . . . . . . . . . . . <=====> . 373B 4 1950 2010 61

 . . . . . . . . . . . . . . . . . . .<====> . 374A 5 1963 2010 48

 . . . . . . . . . . . . . . . . . . .<====> . 374B 6 1967 2010 44

 . . . . . . . . . . . . . . . . . . <======> . 375A 7 1946 2010 65

 . . . . . . . . . . . . . . . . . . <======> . 375B 8 1947 2010 64

 . . . . . . . . . . . . . . . . . . <========> . 376A 9 1921 2010 90

 . . . . . . . . . . . . . . . . . . <=======> . 376B 10 1936 2010 75

 . . . . . . . . . . . . . . . . . . <========> . 377B 11 1920 2010 91

 . . . . . . . . . . . . . . . . . . <========> . 377A 12 1926 2010 85

 . . . . . . . . . . . . . . . . . . <=====> . 378A 13 1958 2010 53

 . . . . . . . . . . . . . . . . . . <=====> . 378B 14 1958 2010 53

 . . . . . . . . . . . . . . . . . . <=====> . 379A 15 1958 2010 53

 . . . . . . . . . . . . . . . . . . <=====> . 379B 16 1957 2010 54

 . . . . . . . . . . . . . . . . . . <=====> . 380A 17 1957 2010 54

 . . . . . . . . . . . . . . . . . . <=====> . 380B 18 1957 2010 54

 . . . . . . . . . . . . . . . . . . .<====> . 381A 19 1960 2010 51

 . . . . . . . . . . . . . . . . . . <=====> . 381B 20 1958 2010 53

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

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

PART 3: Master Dating Series: 18:24 Fri 11 Mar 2011 Page 3

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

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

 1950 -.850 7 2000 .802 20

 1951 .150 7 2001 .876 20

 1952 .349 8 2002 1.080 20

 1953 .175 8 2003 -2.410 20

 1954 1.043 8 2004 -2.099 20

 1955 .599 8 2005 -1.825 20

 1956 .344 8 2006 -.635 20

 1957 1.434 11 2007 .737 20

 1958 1.358 15 2008 .040 20

 1959 .316 15 2009 .730 20

 1960 -.563 16 2010 1.556 20 1<<

 1961 -.003 16

 1962 -1.723 16

 1963 .083 18

 1964 .499 18

 1965 .293 18

 1966 -1.232 18

 1967 .677 19

 1968 -.229 19

 1969 -.117 20

 1920 .111 1 1970 .347 20

 1921 -.748 2 1971 1.754 20

 1922 -.837 2 1972 .050 20

 1923 -1.355 2 1973 -.853 20

 1924 -.414 2 1974 -.331 20

 1925 1.996 2 1975 .796 20

 1926 .259 3 1976 -.258 20

 1927 1.733 3 1977 -.107 20

 1928 1.298 3 1978 .357 20

 1929 .116 3 1979 .070 20

 1930 .675 3 1980 .319 20

 1931 -.538 3 1981 -2.381 20

 1932 .508 3 1982 -1.842 20

 1933 -1.373 3 1983 -.715 20

 1934 -1.693 3 1984 -.344 20

 1935 -.290 3 1985 .780 20

 1936 .786 4 1986 .547 20

 1937 1.046 4 1987 1.667 20

 1938 1.051 4 1988 .633 20

 1939 -.205 4 1989 -.132 20

 1940 -.348 4 1990 .526 20

 1941 .804 4 1991 .091 20

 1942 -.201 4 1992 1.087 20

 1943 -2.267 4 1993 .756 20

 1944 -.874 4 1994 .300 20

 1945 -.538 4 1995 -.212 20

 1946 .001 5 1996 -1.055 20

 1947 -.592 6 1997 .193 20

 1948 -2.610 6 1998 .035 20

 1949 -.352 6 1999 1.312 20

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PART 4: Master Bar Plot: 18:24 Fri 11 Mar 2011 Page 4

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 Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

 1950-c 2000--------C

 1951-----A 2001--------D

 1952------A 2002---------D

 1953-----A 2003j

 1954---------D 2004h

 1955-------B 2005g

 1956------A 2006--c

 1957----------F 2007--------C

 1958---------E 2008-----@

 1959------A 2009--------C

 1960--b 2010----------F

 1961-----@

 1962g

 1963-----@

 1964-------B

 1965------A

 1966-e

 1967--------C

 1968---a

 1969----@

 1920-----@ 1970------A

 1921--c 1971----------G

 1922-c 1972-----@

 1923-e 1973-c

 1924---b 1974---a

 1925----------H 1975--------C

 1926------A 1976---a

 1927----------G 1977----@

 1928---------E 1978------A

 1929-----@ 1979-----@

 1930--------C 1980------A

 1931--b 1981j

 1932-------B 1982g

 1933-e 1983--c

 1934g 1984---a

 1935---a 1985--------C

 1936--------C 1986-------B

 1937---------D 1987----------G

 1938---------D 1988-------C

 1939---a 1989----a

 1940---a 1990-------B

 1941--------C 1991-----@

 1942---a 1992---------D

 1943i 1993--------C

 1944-c 1994------A

 1945--b 1995---a

 1946-----@ 1996-d

 1947--b 1997-----A

 1948j 1998-----@

 1949---a 1999---------E

PART 5: CORRELATION OF SERIES BY SEGMENTS: 18:24 Fri 11 Mar 2011 Page 5

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 Correlations of 50-year dated segments, lagged 25 years

 Flags: A = correlation under .3281 but highest as dated; B = correlation higher at other than dated position

 Seq Series Time\_span 1900 1925 1950 1975

 1949 1974 1999 2024

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

 1 372A 1969 2010 .63

 2 372B 1963 2010 .45

 3 373A 1952 2010 .67 .71

 4 373B 1950 2010 .73 .80

 5 374A 1963 2010 .55

 6 374B 1967 2010 .67

 7 375A 1946 2010 .53 .50 .55

 8 375B 1947 2010 .28B .21B .32A

 9 376A 1921 2010 .29A .30A .38 .56

 10 376B 1936 2010 .43 .51 .67

 11 377B 1920 2010 .47 .46 .63 .77

 12 377A 1926 2010 .59 .51 .55

 13 378A 1958 2010 .59 .59

 14 378B 1958 2010 .43B .49

 15 379A 1958 2010 .67 .66

 16 379B 1957 2010 .74 .77

 17 380A 1957 2010 .70 .72

 18 380B 1957 2010 .74 .79

 19 381A 1960 2010 .76 .82

 20 381B 1958 2010 .69 .71

 Av segment correlation .38 .43 .59 .65

PART 6: POTENTIAL PROBLEMS: 18:24 Fri 11 Mar 2011 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

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

 372A 1969 to 2010 42 years Series 1

 [B] Entire series, effect on correlation ( .632) is:

 Lower 1982> -.027 1980< -.025 1979< -.021 1983> -.020 1978< -.020 1973> -.019 Higher 2003 .061 2005 .038

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

 372B 1963 to 2010 48 years Series 2

 [B] Entire series, effect on correlation ( .450) is:

 Lower 2001< -.090 2004> -.062 1975< -.033 1974< -.017 1996> -.011 1989> -.007 Higher 2005 .059 2003 .028

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

 2004 +3.0 SD

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

 373A 1952 to 2010 59 years Series 3

 [B] Entire series, effect on correlation ( .685) is:

 Lower 1953< -.026 1976> -.020 1974> -.013 1985< -.011 1986< -.011 2005> -.009 Higher 1982 .025 1981 .023

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

 373B 1950 to 2010 61 years Series 4

 [B] Entire series, effect on correlation ( .788) is:

 Lower 1993< -.013 1976> -.012 1999< -.009 1969> -.009 1950< -.008 1961> -.007 Higher 2004 .020 1987 .011

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

 374A 1963 to 2010 48 years Series 5

 [B] Entire series, effect on correlation ( .547) is:

 Lower 1986< -.038 1982> -.037 1976< -.029 1988< -.027 1969> -.022 1968> -.012 Higher 2004 .054 1981 .026

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

 374B 1967 to 2010 44 years Series 6

 [B] Entire series, effect on correlation ( .670) is:

 Lower 1983> -.034 1982> -.031 1973> -.018 1986< -.016 1990< -.016 1989< -.014 Higher 1981 .060 2004 .028

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

 375A 1946 to 2010 65 years Series 7

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

 Lower 1975< -.044 1974< -.025 1976< -.020 1982> -.014 1983> -.011 1984> -.009 Higher 1948 .035 1962 .017

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

 375B 1947 to 2010 64 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

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

 1947 1996 7 -.16 .02 .07 .07 -.01 -.02 -.08 -.09 -.08 .14 .28| .01 -.06 -.02 .00 .10 .14 .32\* .24 .12 -.02

 1950 1999 7 -.09 .04 .10 .11 -.05 -.11 -.17 -.14 -.12 .04 .21|-.05 -.07 .00 -.02 .07 .10 .30\* .29 .23 .07

 1961 2010 0 .20 .23 .31 .06 -.18 -.22 -.27 -.06 -.09 .12 .32\* - - - - - - - - - -

 [B] Entire series, effect on correlation ( .397) is:

 Lower 1971< -.058 1975< -.031 1982> -.025 1983> -.013 2007< -.012 1974< -.012 Higher 1948 .036 2003 .031

 1947 to 1996 segment:

 Lower 1971< -.075 1975< -.039 1982> -.032 1983> -.017 1970< -.013 1984> -.012 Higher 1948 .064 1958 .037

 1950 to 1999 segment:

 Lower 1971< -.082 1975< -.041 1982> -.030 1983> -.018 1984> -.014 1970< -.012 Higher 1958 .040 1973 .037

 1961 to 2010 segment:

 Lower 1971< -.068 1975< -.036 1982> -.032 1983> -.017 2007< -.014 1981> -.013 Higher 2003 .045 2004 .028

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

 376A 1921 to 2010 90 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

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

 1921 1970 0 - - - - - - - - - .09 .29\*-.01 -.15 -.07 .03 .00 -.25 -.17 -.10 -.23 -.06

 1925 1974 0 - - - - - .14 .10 .18 .11 .07 .30\*-.02 -.18 -.07 .10 .05 -.23 -.16 -.10 -.23 -.17

 [B] Entire series, effect on correlation ( .445) is:

 Lower 1942> -.023 1935< -.022 1969< -.016 1960> -.015 1976> -.013 1943> -.012 Higher 1948 .040 2003 .032

 1921 to 1970 segment:

 Lower 1942> -.036 1935< -.033 1960> -.023 1969< -.021 1936< -.017 1930< -.015 Higher 1948 .095 1927 .026

 1925 to 1974 segment:

 Lower 1942> -.037 1935< -.032 1960> -.024 1969< -.018 1936< -.018 1937< -.016 Higher 1948 .102 1971 .027

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

 1942 +3.0 SD

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 376B 1936 to 2010 75 years Series 10

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

 Lower 1945> -.025 1947> -.020 1956< -.019 2006> -.017 1999< -.017 1976> -.016 Higher 2003 .052 1943 .030

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 377B 1920 to 2010 91 years Series 11

 [\*] Early part of series cannot be checked from 1920 to 1920 -- not matched by another series

 [B] Entire series, effect on correlation ( .609) is:

 Lower 1941< -.041 1980< -.021 1960< -.017 1925< -.014 1950> -.013 1942< -.013 Higher 1981 .022 2003 .020

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 377A 1926 to 2010 85 years Series 12

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

 Lower 1974> -.023 1991< -.020 1950> -.020 1935> -.018 2004> -.018 2008< -.010 Higher 1948 .027 1943 .023

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 378A 1958 to 2010 53 years Series 13

 [B] Entire series, effect on correlation ( .495) is:

 Lower 2010< -.101 1984< -.019 1985< -.017 2005> -.012 1967< -.010 1959< -.010 Higher 1981 .060 1982 .035

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

 2009 2010 -4.2 SD

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

 2010 1.556 20 1 >> WARNING: Ring is not usually narrow

 >> WARNING: Last ring in series is ABSENT

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

 378B 1958 to 2010 53 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

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

 1958 2007 1 -.12 -.12 .07 .12 .03 -.08 -.04 -.35 .05 .14 .43| .45\* .30 .09 - - - - - - -

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

 Lower 1962> -.079 1988< -.070 1964< -.029 1969> -.025 1959< -.022 1996> -.017 Higher 1981 .069 2004 .046

 1958 to 2007 segment:

 Lower 1962> -.082 1988< -.074 1964< -.031 1969> -.024 1959< -.024 1996> -.018 Higher 1981 .073 2004 .049

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

 1962 +3.7 SD

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 379A 1958 to 2010 53 years Series 15

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

 Lower 1981> -.029 1973< -.022 1989> -.013 1963> -.012 1977< -.011 1985< -.010 Higher 2004 .030 1982 .027

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 379B 1957 to 2010 54 years Series 16

 [B] Entire series, effect on correlation ( .749) is:

 Lower 1966> -.039 1957< -.033 1983> -.015 1984> -.015 1968> -.007 1965> -.007 Higher 1981 .034 2004 .024

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 380A 1957 to 2010 54 years Series 17

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

 Lower 1958< -.034 1974> -.025 1985< -.021 1973> -.020 1984< -.019 1986< -.019 Higher 1981 .025 2004 .024

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 380B 1957 to 2010 54 years Series 18

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

 Lower 1960< -.048 1965< -.017 2000< -.013 1994< -.012 1977> -.011 1980> -.008 Higher 2003 .028 2004 .023

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 381A 1960 to 2010 51 years Series 19

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

 Lower 1960> -.047 1998> -.011 1989< -.011 1967< -.009 1969< -.008 1974> -.005 Higher 1981 .029 1982 .018

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

 381B 1958 to 2010 53 years Series 20

 [B] Entire series, effect on correlation ( .683) is:

 Lower 1993< -.035 1974> -.019 1964< -.018 1959> -.018 1973> -.014 1999< -.014 Higher 1981 .036 2004 .030

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PART 7: DESCRIPTIVE STATISTICS: 18:24 Fri 11 Mar 2011 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 372A 1969 2010 42 1 0 .632 2.56 4.72 1.026 .787 .247 2.49 .395 .543 0

 2 372B 1963 2010 48 1 0 .450 2.45 4.02 .836 .654 .259 2.31 .322 .238 0

 3 373A 1952 2010 59 2 0 .685 1.42 3.11 .657 .715 .252 2.53 .356 .266 0

 4 373B 1950 2010 61 2 0 .788 1.61 3.59 .740 .765 .256 2.59 .377 .345 0

 5 374A 1963 2010 48 1 0 .547 2.30 3.72 .548 .525 .188 2.31 .198 .165 0

 6 374B 1967 2010 44 1 0 .670 2.09 3.18 .564 .668 .164 2.28 .218 .109 0

 7 375A 1946 2010 65 3 0 .602 1.37 3.67 .772 .847 .257 2.47 .344 .567 0

 8 375B 1947 2010 64 3 3 .397 1.67 4.78 .961 .821 .278 2.60 .404 .671 0

 9 376A 1921 2010 90 4 2 .445 .85 2.36 .353 .750 .220 2.48 .266 .343 0

 10 376B 1936 2010 75 3 0 .512 1.42 3.87 .779 .849 .243 2.42 .275 .345 0

 11 377B 1920 2010 91 4 0 .609 1.25 3.80 .689 .790 .308 2.89 .471 .498 0

 12 377A 1926 2010 85 3 0 .602 .95 2.13 .537 .841 .281 2.49 .339 .393 0

 13 378A 1958 2010 53 2 0 .495 1.75 3.28 .554 .359 .187 2.37 .285 .471 0

 14 378B 1958 2010 53 2 1 .453 1.72 3.12 .533 .671 .193 2.33 .216 .192 0

 15 379A 1958 2010 53 2 0 .675 1.16 3.56 .778 .867 .239 2.33 .321 .409 0

 16 379B 1957 2010 54 2 0 .749 1.76 4.01 .740 .679 .236 2.40 .357 .474 0

 17 380A 1957 2010 54 2 0 .695 1.97 4.04 .826 .751 .221 2.36 .277 .428 0

 18 380B 1957 2010 54 2 0 .748 1.53 3.46 .652 .784 .226 2.38 .273 .251 0

 19 381A 1960 2010 51 2 0 .770 1.61 4.32 .832 .695 .273 2.65 .366 .498 0

 20 381B 1958 2010 53 2 0 .683 1.41 3.45 .525 .575 .207 2.40 .275 .459 0

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

 Total or mean: 1197 44 6 .603 1.56 4.78 .683 .732 .241 2.89 .322 .391

 - = [ COFECHA 5 COF ] = -