**Appendix A.4** – Raw tree-ring width (TRW) data from 33 trees.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **Number** | **Raw width chronology** | **Standard chronology** | **Raw TRW statistics** | |
| 2019 | 83 | 1.83 | 0.85 | *Parameter* | *Values* |
| 2018 | 87 | 2.77 | 0.88 | No. of trees / radii | 24 / 108 |
| 2017 | 87 | 3.13 | 0.96 | Time period | 1860-2019 |
| 2016 | 91 | 3.02 | 1.00 | Average series length (years) | 46 |
| 2015 | 103 | 2.70 | 0.84 | Mean ring width (mm year-1) | 0.10 to 36.74 |
| 2014 | 103 | 3.76 | 1.03 | Mean sensitivity | 0.37 |
| 2013 | 103 | 4.38 | 1.08 | First order autocorrelation | 0.51 |
| 2012 | 103 | 3.79 | 0.95 | Rbar.wta | 2.34 |
| 2011 | 104 | 3.43 | 0.86 | Mean EPSa (1860-2019) | 0.46 |
| 2010 | 104 | 7.35 | 1.65 | Mean EPS(1960-2019) | 0.65 |
| 2009 | 104 | 3.28 | 0.76 |  |  |
| 2008 | 104 | 3.18 | 0.72 | Rbar.wta: mean interseries | |
| 2007 | 104 | 3.83 | 0.77 | EPS: Expressed Population Signal | |
| 2006 | 104 | 4.12 | 0.90 |
| 2005 | 104 | 4.24 | 0.92 |
| 2004 | 104 | 4.38 | 0.92 |
| 2003 | 102 | 4.70 | 0.99 |
| 2002 | 102 | 5.49 | 0.99 |
| 2001 | 103 | 5.39 | 1.01 |
| 2000 | 103 | 5.79 | 1.00 |
| 1999 | 103 | 5.45 | 0.97 |
| 1998 | 103 | 5.81 | 1.03 |
| 1997 | 103 | 5.23 | 0.90 |
| 1996 | 100 | 4.10 | 0.78 |
| 1995 | 99 | 6.33 | 1.08 |
| 1994 | 99 | 4.38 | 0.80 |
| 1993 | 97 | 4.33 | 0.80 |
| 1992 | 93 | 5.96 | 1.17 |
| 1991 | 89 | 4.15 | 0.95 |
| 1990 | 89 | 3.93 | 0.89 |
| 1989 | 85 | 3.56 | 0.73 |
| 1988 | 81 | 4.25 | 0.82 |
| 1987 | 80 | 7.04 | 1.34 |
| 1986 | 69 | 5.38 | 1.09 |
| 1985 | 62 | 4.80 | 0.98 |

**Appendix A.4** – *Continued.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Number** | **Raw width chronology** | **Standard chronology** |
| 1984 | 60 | 3.73 | 0.84 |
| 1983 | 53 | 3.35 | 0.94 |
| 1982 | 51 | 3.55 | 0.95 |
| 1981 | 51 | 3.68 | 0.99 |
| 1980 | 44 | 2.96 | 0.80 |
| 1979 | 37 | 4.11 | 1.15 |
| 1978 | 34 | 2.57 | 0.76 |
| 1977 | 28 | 2.28 | 0.90 |
| 1976 | 26 | 2.06 | 0.97 |
| 1975 | 26 | 1.11 | 0.50 |
| 1974 | 26 | 1.59 | 0.84 |
| 1973 | 22 | 1.73 | 0.88 |
| 1972 | 22 | 1.79 | 0.90 |
| 1971 | 22 | 1.78 | 0.86 |
| 1970 | 22 | 2.07 | 0.90 |
| 1969 | 22 | 3.66 | 1.78 |
| 1968 | 20 | 1.82 | 0.82 |
| 1967 | 20 | 1.32 | 0.56 |
| 1966 | 18 | 1.85 | 0.64 |
| 1965 | 18 | 1.62 | 0.63 |
| 1964 | 18 | 1.79 | 0.75 |
| 1963 | 18 | 4.83 | 1.93 |
| 1962 | 18 | 1.82 | 0.72 |
| 1961 | 18 | 2.02 | 0.80 |
| 1960 | 18 | 2.65 | 0.96 |
| 1959 | 18 | 2.80 | 1.16 |
| 1958 | 18 | 2.32 | 1.11 |
| 1957 | 16 | 2.88 | 1.29 |
| 1956 | 16 | 1.36 | 0.89 |
| 1955 | 16 | 1.17 | 0.80 |
| 1954 | 16 | 0.67 | 0.53 |
| 1953 | 16 | 0.99 | 0.94 |
| 1952 | 16 | 0.90 | 0.82 |
| 1951 | 16 | 1.16 | 1.06 |
| 1950 | 17 | 0.99 | 0.81 |
| 1949 | 16 | 0.70 | 0.89 |
| 1948 | 16 | 0.81 | 1.05 |

**Appendix A.4** – *Continued.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Number** | **Raw width chronology** | **Standard chronology** |
| 1947 | 16 | 0.60 | 0.89 |
| 1946 | 16 | 0.56 | 0.82 |
| 1945 | 16 | 1.23 | 1.53 |
| 1944 | 16 | 0.73 | 0.92 |
| 1943 | 16 | 0.61 | 0.74 |
| 1942 | 16 | 0.68 | 0.79 |
| 1941 | 16 | 0.85 | 1.01 |
| 1940 | 16 | 0.69 | 0.83 |
| 1939 | 16 | 1.03 | 1.03 |
| 1938 | 16 | 1.25 | 1.23 |
| 1937 | 16 | 0.62 | 0.88 |
| 1936 | 16 | 0.63 | 0.74 |
| 1935 | 16 | 0.58 | 0.62 |
| 1934 | 16 | 0.91 | 1.09 |
| 1933 | 16 | 0.73 | 0.85 |
| 1932 | 16 | 0.88 | 1.00 |
| 1931 | 16 | 1.03 | 1.13 |
| 1930 | 16 | 0.83 | 0.81 |
| 1929 | 16 | 0.79 | 0.85 |
| 1928 | 16 | 0.84 | 0.86 |
| 1927 | 16 | 0.97 | 1.10 |
| 1926 | 16 | 1.02 | 1.14 |
| 1925 | 16 | 0.78 | 0.80 |
| 1924 | 16 | 0.83 | 0.81 |
| 1923 | 15 | 0.79 | 0.77 |
| 1922 | 12 | 1.30 | 1.07 |
| 1921 | 12 | 1.88 | 1.51 |
| 1920 | 12 | 0.92 | 0.96 |
| 1919 | 12 | 1.16 | 1.12 |
| 1918 | 12 | 0.68 | 0.74 |
| 1917 | 10 | 0.87 | 0.90 |
| 1916 | 5 | 0.45 | 0.56 |
| 1915 | 5 | 0.60 | 0.78 |
| 1914 | 5 | 0.74 | 1.34 |
| 1913 | 5 | 0.83 | 1.12 |
| 1912 | 5 | 0.47 | 0.53 |
| 1911 | 5 | 0.76 | 0.84 |
| 1910 | 6 | 1.16 | 1.14 |

**Appendix A.4** – *Continued.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Number** | **Raw width chronology** | **Standard chronology** |
| 1909 | 6 | 1.21 | 0.96 |
| 1908 | 6 | 0.80 | 0.94 |
| 1907 | 6 | 0.94 | 1.10 |
| 1906 | 6 | 0.79 | 0.77 |
| 1905 | 6 | 0.64 | 0.67 |
| 1904 | 6 | 1.07 | 1.20 |
| 1903 | 6 | 0.88 | 0.93 |
| 1902 | 4 | 0.85 | 0.64 |
| 1901 | 4 | 0.60 | 0.78 |
| 1900 | 4 | 1.13 | 1.64 |
| 1899 | 4 | 0.89 | 1.25 |
| 1898 | 4 | 0.55 | 0.74 |
| 1897 | 4 | 0.59 | 0.86 |
| 1896 | 4 | 0.74 | 1.21 |
| 1895 | 4 | 0.59 | 0.99 |
| 1894 | 4 | 0.44 | 0.68 |
| 1893 | 4 | 0.53 | 1.05 |
| 1892 | 4 | 0.75 | 1.32 |
| 1891 | 4 | 0.28 | 0.61 |
| 1890 | 4 | 0.64 | 1.27 |
| 1889 | 4 | 0.40 | 0.48 |
| 1888 | 4 | 0.46 | 0.76 |
| 1887 | 4 | 0.53 | 0.84 |
| 1886 | 4 | 0.59 | 0.68 |
| 1885 | 4 | 0.53 | 0.68 |
| 1884 | 4 | 0.69 | 0.94 |
| 1883 | 4 | 1.18 | 1.62 |
| 1882 | 4 | 0.77 | 1.08 |
| 1881 | 4 | 0.91 | 1.25 |
| 1880 | 4 | 0.68 | 0.86 |
| 1879 | 4 | 0.53 | 0.71 |
| 1878 | 4 | 0.39 | 0.55 |
| 1877 | 4 | 1.27 | 1.70 |
| 1876 | 4 | 0.65 | 0.89 |
| 1875 | 4 | 0.75 | 0.78 |
| 1874 | 4 | 0.84 | 1.14 |
| 1873 | 4 | 0.69 | 0.91 |
| 1872 | 4 | 0.56 | 0.78 |

**Appendix A.4** – *Continued.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Number** | **Raw width chronology** | **Standard chronology** |
| 1871 | 4 | 0.76 | 1.03 |
| 1870 | 4 | 0.68 | 0.93 |
| 1869 | 4 | 0.81 | 1.05 |
| 1868 | 4 | 0.61 | 0.69 |
| 1867 | 4 | 0.97 | 1.21 |
| 1866 | 4 | 0.96 | 1.06 |
| 1865 | 4 | 0.94 | 0.89 |
| 1864 | 4 | 0.93 | 0.81 |
| 1863 | 3 | 0.74 | 0.56 |
| 1862 | 2 | 1.23 | 1.32 |
| 1861 | 2 | 0.70 | 0.55 |
| 1860 | 2 | 2.10 | 1.59 |

**Appendix A.5** – Raw tree-ring oxygen isotope (δ18OTR) data from four *Cedrela nebulosa* trees from Mera, central Ecuador.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** |
| 2018 | 18.61 | 25.39 | 25.57 | 29.26 | 24.71 |
| 2017 |  | 24.96 | 25.57 | 26.66 | 25.73 |
| 2016 | 23.15 | 24.96 | 25.14 | 26.33 | 24.89 |
| 2015 | 24.10 | 25.93 | 25.14 | 28.04 | 25.80 |
| 2014 | 25.12 | 25.93 | 24.31 | 24.43 | 24.95 |
| 2013 | 25.60 | 22.79 | 24.31 | 23.66 | 24.09 |
| 2012 | 25.10 | 22.59 | 24.64 | 23.66 | 24.00 |
| 2011 | 22.86 | 22.59 | 25.68 |  | 23.71 |
| 2010 | 25.10 | 24.48 | 25.68 |  | 25.09 |
| 2009 | 24.47 | 24.48 | 24.89 | 23.52 | 24.34 |
| 2008 | 24.89 | 26.79 | 24.89 | 24.18 | 25.19 |
| 2007 | 24.98 | 26.79 | 24.45 | 24.99 | 25.30 |
| 2006 | 25.28 | 25.00 | 24.45 | 24.11 | 24.71 |
| 2005 | 23.70 | 25.00 | 25.93 | 24.74 | 24.84 |
| 2004 | 25.46 | 20.27 | 25.70 | 22.72 | 23.54 |
| 2003 | 26.01 | 20.27 | 25.70 | 23.56 | 23.88 |
| 2002 | 24.23 | 25.78 | 24.81 | 23.85 | 24.67 |
| 2001 | 26.35 | 25.78 | 24.81 | 24.36 | 25.32 |
| 2000 | 23.63 | 25.87 | 26.56 | 24.49 | 25.14 |
| 1999 | 25.16 | 25.87 | 26.56 | 23.27 | 25.21 |
| 1998 | 26.24 | 26.11 | 25.20 | 23.27 | 25.21 |
| 1997 | 24.50 | 26.11 | 25.20 | 25.31 | 25.28 |
| 1996 | 25.48 | 25.57 | 25.20 | 25.31 | 25.39 |
| 1995 | 27.14 | 25.57 | 25.72 | 23.86 | 25.57 |
| 1994 | 24.77 | 26.64 | 25.72 | 23.86 | 25.25 |
| 1993 | 23.20 | 25.67 | 26.90 | 26.02 | 25.45 |
| 1992 |  | 25.67 | 26.90 | 26.02 | 26.20 |
| 1991 |  | 26.63 | 25.32 | 25.94 | 25.96 |
| 1990 |  | 26.63 | 25.32 | 25.31 | 25.75 |
| 1989 |  | 27.44 | 20.73 | 26.33 | 24.83 |
| 1988 |  | 27.44 | 20.73 | 26.33 | 24.83 |
| 1987 | 24.57 | 27.44 | 24.95 | 25.40 | 25.59 |
| 1986 | 23.40 | 26.34 | 24.95 | 23.50 | 24.55 |
| 1985 | 24.55 | 26.34 | 22.63 | 24.70 | 24.55 |
| 1984 | 21.81 | 24.15 | 22.63 | 27.16 | 23.94 |
| 1983 | 24.80 | 24.15 | 21.84 | 25.11 | 23.97 |
| 1982 | 25.61 | 26.34 | 21.84 | 23.37 | 24.29 |
| 1981 | 23.49 | 26.34 | 22.46 | 24.78 | 24.27 |
| 1980 | 23.91 | 24.16 | 22.46 | 23.87 | 23.60 |

**Appendix A.5** – *Continued.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** |
| 1979 | 25.06 | 24.97 | 24.14 | 23.96 | 24.53 |
| 1978 | 25.47 | 24.97 | 24.14 | 23.90 | 24.62 |
| 1977 | 23.00 | 26.08 | 22.17 | 24.48 | 23.93 |
| 1976 | 22.92 | 26.08 | 22.17 | 21.65 | 23.21 |
| 1975 | 22.36 | 26.06 | 22.16 | 22.60 | 23.29 |
| 1974 | 22.59 | 23.02 | 22.16 | 24.66 | 23.11 |
| 1973 | 24.74 | 23.02 | 22.20 | 24.70 | 23.66 |
| 1972 | 25.13 | 23.05 | 22.20 | 22.15 | 23.13 |
| 1971 | 24.98 | 21.31 | 20.48 | 25.17 | 22.99 |
| 1970 | 23.77 | 21.30 | 20.48 | 24.90 | 22.61 |
| 1969 | 24.19 | 21.30 | 21.20 | 26.00 | 23.17 |
| 1968 | 24.08 | 21.30 | 21.20 | 26.00 | 23.14 |
| 1967 | 24.65 | 23.31 | 22.74 | 26.00 | 24.18 |
| 1966 | 23.71 | 23.31 | 22.74 | 26.21 | 23.99 |
| 1965 | 24.15 | 23.58 | 22.74 | 26.21 | 24.17 |
| 1964 | 23.86 | 23.58 | 21.95 | 26.21 | 23.90 |
| 1963 | 21.50 | 23.53 | 21.95 | 26.21 | 23.30 |
| 1962 | 23.85 | 23.53 | 25.20 | 26.61 | 24.80 |
| 1961 | 25.12 | 25.68 | 25.20 | 26.61 | 25.65 |
| 1960 | 23.49 | 25.68 | 23.74 | 26.61 | 24.88 |
| 1959 | 23.19 | 25.41 | 23.74 | 26.61 | 24.74 |
| 1958 | 22.85 | 25.41 | 22.83 | 25.32 | 24.10 |
| 1957 | 23.53 | 22.05 | 22.83 | 25.32 | 23.43 |
| 1956 | 24.80 | 22.05 | 23.85 | 24.02 | 23.68 |
| 1955 | 22.61 | 23.38 | 23.85 | 24.02 | 23.47 |
| 1954 | 20.72 | 23.38 | 22.60 | 24.02 | 22.68 |
| 1953 | 21.16 | 25.05 | 22.60 | 24.80 | 23.40 |
| 1952 |  | 25.05 | 22.71 | 24.80 | 24.19 |
| 1951 |  | 25.05 | 22.71 | 24.27 | 24.01 |
| 1950 |  |  | 22.71 | 24.27 | 23.49 |
| 1949 | 23.08 |  | 20.14 | 24.27 | 22.50 |
| 1948 |  | 22.02 | 20.14 | 24.10 | 22.09 |
| 1947 |  | 22.25 | 22.91 | 24.88 | 23.35 |
| 1946 | 23.94 | 22.25 | 22.91 | 24.88 | 23.50 |
| 1945 |  | 23.50 | 21.44 | 25.78 | 23.57 |
| 1944 |  | 23.50 | 21.44 | 25.78 | 23.57 |
| 1943 | 26.43 | 25.18 | 18.84 | 25.66 | 24.03 |
| 1942 | 26.18 | 25.18 | 20.48 | 25.03 | 24.22 |
| 1941 | 26.76 | 24.69 | 20.88 | 25.03 | 24.34 |
| 1940 | 25.92 | 24.69 | 20.88 | 25.03 | 24.13 |

**Appendix A.5** – *Continued.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** |
| 1939 |  | 25.03 | 21.03 | 23.82 | 23.29 |
| 1938 | 24.39 | 25.03 | 21.03 | 23.82 | 23.56 |
| 1937 |  | 25.03 | 20.17 | 23.82 | 23.00 |
| 1936 | 23.36 | 24.69 | 20.17 | 23.40 | 22.90 |
| 1935 |  | 24.69 | 22.18 | 23.40 | 23.42 |
| 1934 |  | 22.87 | 23.79 | 23.40 | 23.35 |
| 1933 |  | 22.87 | 23.79 | 23.40 | 23.35 |
| 1932 | 23.92 |  | 24.02 | 26.81 | 24.92 |
| 1931 |  |  | 24.02 | 26.81 | 25.42 |
| 1930 |  |  | 23.05 | 26.81 | 24.93 |
| 1929 |  |  |  | 26.81 | 26.81 |
| 1928 | 24.28 |  |  | 26.44 | 25.36 |
| 1927 |  |  |  | 26.44 | 26.44 |
| 1926 |  |  |  | 26.44 | 26.44 |
| 1925 |  |  |  | 26.44 | 26.44 |
| 1924 |  |  |  | 25.21 | 25.21 |
| 1923 | 22.24 |  |  | 25.21 | 23.73 |
| 1922 | 22.55 |  |  | 25.21 | 23.88 |
| 1921 | 22.53 |  |  | 25.21 | 23.87 |
| 1920 | 25.60 |  |  | 25.30 | 25.45 |
| 1919 |  |  |  | 25.30 | 25.30 |
| 1918 | 24.14 |  |  | 25.30 | 24.72 |
| 1917 |  |  |  | 25.30 | 25.30 |
| 1916 | 23.04 |  |  | 23.70 | 23.37 |
| 1915 | 23.94 |  |  | 23.70 | 23.82 |
| 1914 | 24.50 |  |  | 23.70 | 24.10 |
| 1913 | 22.60 |  |  | 23.81 | 23.21 |
| 1912 | 23.73 |  |  | 23.81 | 23.77 |
| 1911 | 25.55 |  |  | 23.81 | 24.68 |
| 1910 | 25.55 |  |  | 22.96 | 24.26 |
| 1909 |  |  |  | 22.96 | 22.96 |
| 1908 |  |  |  | 23.68 | 23.68 |
| 1907 |  |  |  | 23.68 | 23.68 |
| 1906 |  |  |  | 23.68 | 23.68 |
| 1905 |  |  |  | 25.15 | 25.15 |
| 1904 |  |  |  | 23.36 | 23.36 |
| 1903 |  |  |  | 23.36 | 23.36 |
| 1902 |  |  |  | 23.50 | 23.50 |
| 1901 |  |  |  | 23.51 | 23.51 |
| 1900 |  |  |  | 23.35 | 23.35 |

**Appendix A.5** – *Continued.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** |
| 1899 |  |  |  | 24.05 | 24.05 |
| 1898 |  |  |  | 22.68 | 22.68 |
| 1897 |  |  |  | 22.68 | 22.68 |
| 1896 |  |  |  | 22.32 | 22.32 |
| 1895 |  |  |  | 21.75 | 21.75 |
| 1894 |  |  |  | 20.85 | 20.85 |
| 1893 |  |  |  | 20.85 | 20.85 |
| 1892 |  |  |  | 22.74 | 22.74 |
| 1891 |  |  |  | 23.17 | 23.17 |
| 1890 |  |  |  | 23.16 | 23.16 |
| 1889 |  |  |  | 22.38 | 22.38 |
| 1888 |  |  |  | 22.89 | 22.89 |
| 1887 |  |  |  | 22.06 | 22.06 |
| 1886 |  |  |  | 20.68 | 20.68 |
| 1885 |  |  |  | 21.35 | 21.35 |
| 1884 |  |  |  | 21.35 | 21.35 |
| 1883 |  |  |  | 23.86 | 23.86 |
| 1882 |  |  |  | 23.86 | 23.86 |
| 1881 |  |  |  | 22.13 | 22.13 |
| 1880 |  |  |  | 22.13 | 22.13 |
| 1879 |  |  |  | 22.13 | 22.13 |
| 1878 |  |  |  | 22.70 | 22.70 |
| 1877 |  |  |  | 22.70 | 22.70 |
| 1876 |  |  |  | 24.23 | 24.23 |
| 1875 |  |  |  | 24.73 | 24.73 |
| 1874 |  |  |  | 24.73 | 24.73 |
| 1873 |  |  |  | 25.04 | 25.04 |
| 1872 |  |  |  | 24.85 | 24.85 |
| 1871 |  |  |  | 25.35 | 25.35 |
| 1870 |  |  |  | 23.49 | 23.49 |
| 1869 |  |  |  | 22.37 | 22.37 |
| 1868 |  |  |  | 22.37 | 22.37 |
| 1867 |  |  |  | 21.59 | 21.59 |
| 1866 |  |  |  | 22.34 | 22.34 |
| 1865 |  |  |  | 22.10 | 22.10 |
| 1864 |  |  |  | 22.24 | 22.24 |

**Appendix A.6** – Raw tree-ring carbon isotope (δ13CTR) data from four *Cedrela nebulosa* trees from Mera, central Ecuador.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** | **Δ** | **δ13C** |
| 2018 | -26.43 | -27.94 | -27.93 | -27.24 | -27.39 | 1.97 | -25.42 |
| 2017 |  | -26.54 | -27.93 | -27.56 | -27.34 | 1.95 | -25.39 |
| 2016 | -26.70 | -26.54 | -27.88 | -27.18 | -27.07 | 1.93 | -25.14 |
| 2015 |  | -26.56 | -27.88 | -27.45 | -27.30 | 1.91 | -25.39 |
| 2014 | -25.94 | -26.56 | -27.42 |  | -26.64 | 1.89 | -24.75 |
| 2013 | -25.66 | -26.73 | -27.42 | -28.95 | -27.19 | 1.87 | -25.32 |
| 2012 | -26.40 | -26.86 | -27.83 | -28.95 | -27.51 | 1.85 | -25.66 |
| 2011 | -26.77 | -26.86 | -29.00 |  | -27.54 | 1.83 | -25.71 |
| 2010 |  | -26.41 | -29.00 |  | -27.70 | 1.81 | -25.89 |
| 2009 | -25.87 | -26.41 | -29.51 | -27.78 | -27.39 | 1.79 | -25.60 |
| 2008 | -26.03 | -26.21 | -29.51 | -27.44 | -27.30 | 1.77 | -25.53 |
| 2007 |  | -26.21 | -29.65 | -27.24 | -27.70 | 1.75 | -25.95 |
| 2006 | -26.24 | -26.89 | -29.65 | -27.33 | -27.53 | 1.73 | -25.80 |
| 2005 | -26.23 | -26.89 | -29.09 | -27.26 | -27.37 | 1.71 | -25.66 |
| 2004 | -26.49 | -26.83 | -29.47 | -27.26 | -27.51 | 1.69 | -25.82 |
| 2003 | -26.22 | -26.83 | -29.47 | -27.30 | -27.45 | 1.67 | -25.78 |
| 2002 | -26.36 | -26.86 | -29.28 | -27.62 | -27.53 | 1.65 | -25.88 |
| 2001 | -26.18 | -26.86 | -29.28 | -27.15 | -27.37 | 1.62 | -25.75 |
| 2000 | -26.93 | -27.18 | -29.78 | -26.88 | -27.69 | 1.59 | -26.10 |
| 1999 | -26.08 | -27.18 | -29.78 | -28.05 | -27.77 | 1.56 | -26.21 |
| 1998 | -26.15 | -27.26 | -30.54 | -28.05 | -28.00 | 1.53 | -26.47 |
| 1997 | -26.49 | -27.26 | -30.54 | -27.79 | -28.02 | 1.51 | -26.51 |
| 1996 | -26.37 | -26.05 | -30.54 | -27.79 | -27.68 | 1.48 | -26.20 |
| 1995 | -26.31 | -26.05 | -27.58 | -27.36 | -26.82 | 1.45 | -25.37 |
| 1994 | -26.06 | -26.83 | -27.58 | -27.36 | -26.96 | 1.42 | -25.54 |
| 1993 | -26.51 | -27.23 | -28.23 | -27.65 | -27.41 | 1.39 | -26.02 |
| 1992 |  | -27.23 | -28.23 | -27.65 | -27.70 | 1.37 | -26.33 |
| 1991 |  | -27.20 | -28.73 | -26.61 | -27.52 | 1.34 | -26.18 |
| 1990 |  | -27.20 | -28.73 | -27.53 | -27.82 | 1.31 | -26.51 |
| 1989 |  | -27.17 | -29.35 | -27.16 | -27.90 | 1.28 | -26.62 |
| 1988 |  | -27.17 | -29.35 | -27.16 | -27.90 | 1.25 | -26.65 |
| 1987 |  | -27.17 | -28.64 | -27.23 | -27.68 | 1.22 | -26.46 |
| 1986 | -26.03 | -28.30 | -28.64 | -27.59 | -27.64 | 1.20 | -26.44 |
| 1985 | -25.96 | -28.30 | -27.65 | -27.02 | -27.23 | 1.17 | -26.06 |
| 1984 | -26.36 | -27.92 | -27.65 | -27.01 | -27.24 | 1.14 | -26.10 |
| 1983 | -26.37 | -27.92 | -26.44 | -27.24 | -26.99 | 1.11 | -25.88 |
| 1982 | -26.24 | -27.53 | -26.44 | -27.36 | -26.89 | 1.08 | -25.81 |
| 1981 | -26.28 | -27.53 | -26.99 | -27.34 | -27.03 | 1.06 | -25.97 |
| 1980 | -26.20 | -28.51 | -26.99 | -26.97 | -27.17 | 1.03 | -26.14 |

**Appendix A.6** – *Continued.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** | **Δ** | **δ13C** |
| 1979 | -26.41 | -28.28 | -26.91 | -26.83 | -27.11 | 1.00 | -26.11 |
| 1978 | -26.80 | -28.28 | -26.91 | -26.79 | -27.19 | 0.97 | -26.22 |
| 1977 | -26.13 | -26.08 | -27.37 | -27.44 | -26.75 | 0.94 | -25.81 |
| 1976 | -25.84 | -26.08 | -27.37 | -27.18 | -26.62 | 0.92 | -25.70 |
| 1975 | -26.98 | -26.76 | -27.32 | -27.05 | -27.03 | 0.89 | -26.14 |
| 1974 | -28.09 | -27.00 | -27.32 | -27.28 | -27.42 | 0.86 | -26.56 |
| 1973 | -27.41 | -27.00 | -27.43 | -27.26 | -27.27 | 0.83 | -26.44 |
| 1972 | -27.76 | -27.23 | -27.43 | -26.55 | -27.24 | 0.80 | -26.44 |
| 1971 | -27.34 | -26.80 | -27.45 | -26.57 | -27.04 | 0.77 | -26.27 |
| 1970 | -28.09 | -26.82 | -27.45 | -26.31 | -27.17 | 0.75 | -26.42 |
| 1969 | -27.53 | -26.82 | -27.34 | -28.67 | -27.59 | 0.72 | -26.87 |
| 1968 | -28.02 | -26.82 | -27.34 | -28.67 | -27.71 | 0.69 | -27.02 |
| 1967 | -28.63 | -26.46 | -27.40 | -28.67 | -27.79 | 0.66 | -27.13 |
| 1966 | -28.63 | -26.46 | -27.40 | -29.42 | -27.98 | 0.63 | -27.35 |
| 1965 | -28.22 | -26.79 | -27.40 | -29.42 | -27.96 | 0.61 | -27.35 |
| 1964 | -28.50 | -26.79 | -27.91 | -29.42 | -28.16 | 0.58 | -27.58 |
| 1963 | -28.63 | -27.44 | -27.91 | -29.42 | -28.35 | 0.55 | -27.80 |
| 1962 | -28.71 | -27.44 | -27.34 |  | -27.83 | 0.52 | -27.31 |
| 1961 | -28.53 | -27.08 | -27.34 |  | -27.65 | 0.50 | -27.15 |
| 1960 | -28.37 | -27.08 | -27.71 |  | -27.72 | 0.50 | -27.22 |
| 1959 | -28.35 | -27.36 | -27.71 |  | -27.81 | 0.50 | -27.31 |
| 1958 | -28.19 | -27.36 | -27.64 | -29.49 | -28.17 | 0.49 | -27.68 |
| 1957 | -28.49 | -27.86 | -27.64 | -29.49 | -28.37 | 0.49 | -27.88 |
| 1956 |  | -27.86 | -29.11 |  | -28.49 | 0.48 | -28.01 |
| 1955 | -28.74 | -28.19 | -29.11 |  | -28.68 | 0.48 | -28.20 |
| 1954 | -28.73 | -28.19 | -30.15 |  | -29.02 | 0.47 | -28.55 |
| 1953 | -29.19 | -27.82 | -30.15 |  | -29.05 | 0.47 | -28.58 |
| 1952 |  | -27.82 | -30.11 |  | -28.96 | 0.46 | -28.50 |
| 1951 |  | -27.82 | -30.11 | -28.46 | -28.80 | 0.46 | -28.34 |
| 1950 |  | -28.06 | -30.11 | -28.46 | -28.88 | 0.46 | -28.42 |
| 1949 | -27.20 | -28.06 | -28.52 | -28.46 | -28.06 | 0.45 | -27.61 |
| 1948 |  | -27.29 | -28.52 | -27.94 | -27.91 | 0.45 | -27.46 |
| 1947 |  | -28.38 | -28.67 | -27.89 | -28.31 | 0.44 | -27.87 |
| 1946 | -28.20 | -28.38 | -28.67 | -27.89 | -28.28 | 0.44 | -27.84 |
| 1945 |  | -29.60 | -28.75 | -27.77 | -28.71 | 0.43 | -28.28 |
| 1944 |  | -29.60 | -28.75 | -27.77 | -28.71 | 0.43 | -28.28 |
| 1943 | -28.49 | -30.68 | -29.13 | -27.27 | -28.89 | 0.42 | -28.47 |
| 1942 | -27.70 | -30.68 | -29.26 | -27.71 | -28.84 | 0.42 | -28.42 |
| 1941 | -27.78 | -31.41 | -28.98 | -27.71 | -28.97 | 0.42 | -28.55 |
| 1940 | -29.23 | -31.41 | -28.98 | -27.71 | -29.33 | 0.41 | -28.92 |

**Appendix A.6** – *Continued.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** | **Δ** | **δ13C** |
| 1939 |  | -29.50 | -27.68 | -29.62 | -28.93 | 0.41 | -28.52 |
| 1938 | -30.78 | -29.50 | -27.68 | -29.62 | -29.40 | 0.40 | -29.00 |
| 1937 |  | -29.50 | -28.88 | -29.62 | -29.33 | 0.40 | -28.93 |
| 1936 | -30.56 | -29.91 | -28.88 | -29.60 | -29.74 | 0.39 | -29.35 |
| 1935 |  | -29.91 | -30.31 | -29.60 | -29.94 | 0.39 | -29.55 |
| 1934 |  | -28.81 | -28.80 | -29.60 | -29.07 | 0.38 | -28.69 |
| 1933 |  | -28.81 | -28.80 | -29.60 | -29.07 | 0.38 | -28.69 |
| 1932 | -30.19 |  | -27.50 | -29.74 | -29.14 | 0.38 | -28.76 |
| 1931 |  |  | -27.50 | -29.74 | -28.62 | 0.37 | -28.25 |
| 1930 |  |  | -26.74 | -29.74 | -28.24 | 0.37 | -27.87 |
| 1929 |  |  |  | -29.74 | -29.74 | 0.36 | -29.38 |
| 1928 | -29.94 |  |  | -30.22 | -30.08 | 0.36 | -29.72 |
| 1927 |  |  |  | -30.22 | -30.22 | 0.35 | -29.87 |
| 1926 |  |  |  | -30.22 | -30.22 | 0.35 | -29.87 |
| 1925 |  |  |  | -30.22 | -30.22 | 0.34 | -29.88 |
| 1924 |  |  |  | -29.97 | -29.97 | 0.34 | -29.63 |
| 1923 | -29.33 |  |  | -29.97 | -29.65 | 0.34 | -29.31 |
| 1922 | -29.91 |  |  | -29.97 | -29.94 | 0.33 | -29.61 |
| 1921 | -29.42 |  |  | -29.97 | -29.69 | 0.33 | -29.36 |
| 1920 | -29.61 |  |  | -29.53 | -29.57 | 0.32 | -29.25 |
| 1919 |  |  |  | -29.53 | -29.53 | 0.32 | -29.21 |
| 1918 | -29.18 |  |  | -29.53 | -29.35 | 0.31 | -29.04 |
| 1917 |  |  |  | -29.53 | -29.53 | 0.31 | -29.22 |
| 1916 | -29.76 |  |  | -29.58 | -29.67 | 0.30 | -29.37 |
| 1915 | -29.47 |  |  | -29.58 | -29.53 | 0.30 | -29.23 |
| 1914 | -29.27 |  |  | -29.58 | -29.42 | 0.30 | -29.12 |
| 1913 | -28.83 |  |  | -29.65 | -29.24 | 0.29 | -28.95 |
| 1912 | -28.81 |  |  | -29.65 | -29.23 | 0.29 | -28.94 |
| 1911 | -29.11 |  |  | -29.65 | -29.38 | 0.28 | -29.10 |
| 1910 |  |  |  | -29.11 | -29.11 | 0.28 | -28.83 |
| 1909 |  |  |  | -29.11 | -29.11 | 0.27 | -28.84 |
| 1908 |  |  |  | -28.12 | -28.12 | 0.27 | -27.85 |
| 1907 |  |  |  | -28.12 | -28.12 | 0.26 | -27.86 |
| 1906 |  |  |  | -28.12 | -28.12 | 0.26 | -27.86 |
| 1905 |  |  |  | -28.98 | -28.98 | 0.26 | -28.72 |
| 1904 |  |  |  | -28.52 | -28.52 | 0.25 | -28.27 |
| 1903 |  |  |  | -28.52 | -28.52 | 0.25 | -28.27 |
| 1902 |  |  |  | -28.58 | -28.58 | 0.24 | -28.34 |
| 1901 |  |  |  | -28.85 | -28.85 | 0.24 | -28.61 |
| 1900 |  |  |  | -29.27 | -29.27 | 0.23 | -29.04 |

**Appendix A.6** – *Continued.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **year** | **MECE22** | **MECE24** | **MECE25** | **MECE26** | **Mean** | **Δ** | **δ13C** |
| 1899 |  |  |  | -28.97 | -28.97 | 0.23 | -28.74 |
| 1898 |  |  |  | -28.77 | -28.77 | 0.22 | -28.55 |
| 1897 |  |  |  | -28.77 | -28.77 | 0.22 | -28.55 |
| 1896 |  |  |  | -28.99 | -28.99 | 0.22 | -28.77 |
| 1895 |  |  |  | -29.02 | -29.02 | 0.21 | -28.81 |
| 1894 |  |  |  | -29.00 | -29.00 | 0.21 | -28.79 |
| 1893 |  |  |  | -29.00 | -29.00 | 0.20 | -28.80 |
| 1892 |  |  |  | -29.14 | -29.14 | 0.20 | -28.94 |
| 1891 |  |  |  | -29.21 | -29.21 | 0.19 | -29.02 |
| 1890 |  |  |  | -29.10 | -29.10 | 0.19 | -28.91 |
| 1889 |  |  |  | -29.51 | -29.51 | 0.18 | -29.33 |
| 1888 |  |  |  | -29.26 | -29.26 | 0.18 | -29.08 |
| 1887 |  |  |  | -29.00 | -29.00 | 0.18 | -28.82 |
| 1886 |  |  |  | -29.07 | -29.07 | 0.17 | -28.90 |
| 1885 |  |  |  | -28.79 | -28.79 | 0.17 | -28.62 |
| 1884 |  |  |  | -28.79 | -28.79 | 0.16 | -28.63 |
| 1883 |  |  |  | -28.98 | -28.98 | 0.16 | -28.82 |
| 1882 |  |  |  | -28.98 | -28.98 | 0.15 | -28.83 |
| 1881 |  |  |  | -29.39 | -29.39 | 0.15 | -29.24 |
| 1880 |  |  |  | -29.39 | -29.39 | 0.15 | -29.24 |
| 1879 |  |  |  | -29.39 | -29.39 | 0.14 | -29.25 |
| 1878 |  |  |  | -28.42 | -28.42 | 0.14 | -28.28 |
| 1877 |  |  |  | -28.42 | -28.42 | 0.13 | -28.29 |
| 1876 |  |  |  | -27.97 | -27.97 | 0.13 | -27.84 |
| 1875 |  |  |  | -28.81 | -28.81 | 0.12 | -28.69 |
| 1874 |  |  |  | -28.81 | -28.81 | 0.12 | -28.69 |
| 1873 |  |  |  | -29.29 | -29.29 | 0.11 | -29.18 |
| 1872 |  |  |  | -28.89 | -28.89 | 0.11 | -28.78 |
| 1871 |  |  |  | -28.48 | -28.48 | 0.11 | -28.37 |
| 1870 |  |  |  | -28.13 | -28.13 | 0.10 | -28.03 |
| 1869 |  |  |  | -27.99 | -27.99 | 0.10 | -27.89 |
| 1868 |  |  |  | -27.99 | -27.99 | 0.09 | -27.90 |
| 1867 |  |  |  | -28.04 | -28.04 | 0.09 | -27.95 |
| 1866 |  |  |  | -28.27 | -28.27 | 0.08 | -28.19 |
| 1865 |  |  |  | -28.51 | -28.51 | 0.08 | -28.43 |
| 1864 |  |  |  | -28.80 | -28.80 | 0.07 | -28.73 |