**Table S2: Calculating the summed squared differences for optimal chronology shifting.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Shark | Point 1 | Point 2 | Point 3 | Point 4 | Diff. 1 | Diff. 2 | Diff. 3 | Diff. 4 | Sum  |
| WS81 | 1963 | 1964.5 | 1967 | 1970 | 26.2144 | 38.5641 | 51.5524 | 60.6841 | 177.015 |
|  | 1962 | 1963.5 | 1966 | 1969 | 16.9744 | 27.1441 | 38.1924 | 46.1041 | 128.415 |
|  | 1961 | 1962.5 | 1965 | 1968 | 9.7344 | 17.7241 | 26.8324 | 33.5241 | 87.815 |
|  | 1960 | 1961.5 | 1964 | 1967 | 4.4944 | 10.3041 | 17.4724 | 22.9441 | 55.215 |
|  | 1959 | 1960.5 | 1963 | 1966 | 1.2544 | 4.8841 | 10.1124 | 14.3641 | 30.615 |
|  | 1958 | 1959.5 | 1962 | 1965 | 0.0144 | 1.4641 | 4.7524 | 7.7841 | 14.015 |
|  | 1957 | 1958.5 | 1961 | 1964 | 0.7744 | 0.0441 | 1.3924 | 3.2041 | 5.415 |
|  | 1956 | 1957.5 | 1960 | 1963 | 3.5344 | 0.6241 | 0.0324 | 0.6241 | **4.815\*** |
|  | 1955 | 1956.5 | 1959 | 1962 | 8.2944 | 3.2041 | 0.6724 | 0.0441 | 12.215 |
|  | 1954 | 1955.5 | 1958 | 1961 | 15.0544 | 7.7841 | 3.3124 | 1.4641 | 27.615 |
| WS105 | 1980 | 1982 | 1984 |  | 496.3984 | 513.9289 | 369.4084 |  | 1379.7357 |
|  | 1979 | 1981 | 1983 |  | 452.8384 | 469.5889 | 331.9684 |  | 1254.3957 |
|  | 1978 | 1980 | 1982 |  | 411.2784 | 427.2489 | 296.5284 |  | 1135.0557 |
|  | 1977 | 1979 | 1981 |  | 371.7184 | 386.9089 | 263.0884 |  | 1021.7157 |
|  | 1976 | 1978 | 1980 |  | 334.1584 | 348.5689 | 231.6484 |  | 914.3757 |
|  | 1975 | 1977 | 1979 |  | 298.5984 | 312.2289 | 202.2084 |  | 813.0357 |
|  | 1974 | 1976 | 1978 |  | 265.0384 | 277.8889 | 174.7684 |  | 717.6957 |
|  | 1973 | 1975 | 1977 |  | 233.4784 | 245.5489 | 149.3284 |  | 628.3557 |
|  | 1972 | 1974 | 1976 |  | 203.9184 | 215.2089 | 125.8884 |  | 545.0157 |
|  | 1971 | 1973 | 1975 |  | 176.3584 | 186.8689 | 104.4484 |  | 467.6757 |
|  | 1970 | 1972 | 1974 |  | 150.7984 | 160.5289 | 85.0084 |  | 396.3357 |
|  | 1969 | 1971 | 1973 |  | 127.2384 | 136.1889 | 67.5684 |  | 330.9957 |
|  | 1968 | 1970 | 1972 |  | 105.6784 | 113.8489 | 52.1284 |  | 271.6557 |
|  | 1967 | 1969 | 1971 |  | 86.1184 | 93.5089 | 38.6884 |  | 218.3157 |
|  | 1966 | 1968 | 1970 |  | 68.5584 | 75.1689 | 27.2484 |  | 170.9757 |
|  | 1965 | 1967 | 1969 |  | 52.9984 | 58.8289 | 17.8084 |  | 129.6357 |
|  | 1964 | 1966 | 1968 |  | 39.4384 | 44.4889 | 10.3684 |  | 94.2957 |
|  | 1963 | 1965 | 1967 |  | 27.8784 | 32.1489 | 4.9284 |  | 64.9557 |
|  | 1962 | 1964 | 1966 |  | 18.3184 | 21.8089 | 1.4884 |  | 41.6157 |
|  | 1961 | 1963 | 1965 |  | 10.7584 | 13.4689 | 0.0484 |  | 24.2757 |
|  | 1960 | 1962 | 1964 |  | 5.1984 | 7.1289 | 0.6084 |  | 12.9357 |
|  | 1959 | 1961 | 1963 |  | 1.6384 | 2.7889 | 3.1684 |  | **7.5957\*** |
|  | 1958 | 1960 | 1962 |  | 0.0784 | 0.4489 | 7.7284 |  | 8.2557 |
|  | 1957 | 1959 | 1961 |  | 0.5184 | 0.1089 | 14.2884 |  | 14.9157 |
| WS134 | 1961.5 | 1962 |  |  | 8.5264 | 11.1556 |  |  | 19.682 |
|  | 1962.5 | 1963 |  |  | 3.6864 | 5.4756 |  |  | 9.162 |
|  | 1963.5 | 1964 |  |  | 0.8464 | 1.7956 |  |  | 2.642 |
|  | 1964.5 | 1965 |  |  | 0.0064 | 0.1156 |  |  | **0.122\*** |
|  | 1965.5 | 1966 |  |  | 1.1664 | 0.4356 |  |  | 1.602 |
|  | 1966.5 | 1967 |  |  | 4.3264 | 2.7556 |  |  | 7.082 |

The top line for each chronology is its original placement based on band pair counts. Subsequent lines move the ∆14C values step-wise one year closer to their corresponding date on the reference chronology (the values in column 3 from Table S1). Columns “Diffs. 1-4” refer to the squared differences between the date on the reference chronology and the step-wise adjusted year. “Sum” is the summed squared differences for all points from one shark, and the optimum shift is when this value is minimized; these values have been bolded and starred (\*) for each chronology.