Supplementary Table S1. The sites, locations, ARWs, and other specifications of the modern tree-ring data sets of white spruce, tamarack, and black spruce used in this study. Only the white spruce data were used in the interpretations of climate conditions due to the limited availability of tamarack and spatial limitations of both tamarack and black spruce (Supplementary Fig. S1). The values in the “Dist x 110 km” column are the approximate distances from the respective site to the southern range of the species at the same longitude, broken into groups covering 110 km north-south, the approximate N-S distance of 1° latitude (see y-axis in Fig. 7 and Supplementary Fig. S1). All sites are from central and eastern Canada. All data sets are available on the International Tree Ring Data Bank, https://www.ncdc.noaa.gov/data-access/paleoclimatology-data, accessed 2016-2018.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Data set** | **Site Name** | **Lat****ºN** | **Long ºW** | **Elev (m)** |  **No. Sam-ples** | **Dist x110 km\*** | **ARW Juv** |  **N Juv** | **ARW Mat** | **N Mat** | **Authors** |
| ***Picea glauca* (white spruce)** |  |  |  |  |  |  |  |  |  |  |
| CANA270 | White Spruce Upland | 58.600 | 93.800 | 50 | 79 | 12 | 96.96 | 79 | 74.40 | 47 | S.D. Mamet, G.P. Kershaw  |
| CANA209 | Eyeglass Lake | 57.917 | 61.600 | 100 | 10 | 12 | 57.68 | 10 | 57.03 | 10 | B. Buckley, R. D'Arrigo  |
| CANA159 | Castle Peninsula | 56.170 | 76.550 | 50 | 14 | 11 | 55.85 | 14 | 41.64 | 14 | G. Jacoby, R. D'Arrigo, B. Buckley |
| CANA063 | Wakuach Lake | 55.283 | 67.117 | 1200 | 12 | 10 | 98.18 | 12 | 85.40 | 12 | F.H. Schweingruber |
| CANA313 | Ittihauk | 56.000 | 61.000 | 50 | 16 | 10 | 86.71 | 16 | 76.06 | 16 | R. D'Arrigo, B. Buckley, G. Jacoby |
| CANA309 | Tombolo | 56.000 | 61.000 | 50 | 15 | 10 | 29.15 | 15 | 28.29 | 15 | R. D'Arrigo, B. Buckley, G. Jacoby |
| CANA030 | Border Beacon | 55.333 | 63.250 | 1500 | 18 | 9 | 59.51 | 18 | 57.84 | 16 | H.E. Wright, H. Lamb |
| CANA079 | Webequie | 53.070 | 87.330 | 645 | 12 | 7 | 111.17 | 12 | 73.24 | 12 | F.H. Schweingruber |
| CANA056 | Capotigaman | 50.167 | 68.167 | 1000 | 13 | 6 | 107.74 | 13 | 115.60 | 13 | F.H. Schweingruber |
| CANA312 | Pistolet | 51.317 | 55.417 | 50 | 32 | 5 | 110.09 | 32 | 94.55 | 28 | R. D'Arrigo, B. Buckley, G. Jacoby |
| CANA197 | Bolen Lake | 57.867 | 103.800 | 425 | 14 | 4 | 168.85 | 14 | 123.21 | 14 | A. Beriault, D. Sauchyn, J. Stroich  |
| CANA198 | Doupe Bay, Jan Lake | 54.933 | 102.783 | 315 | 31 | 4 | 199.88 | 31 | 181.37 | 24 | A.. Beriault D. Sauchyn J. Stroich  |
| CANA041 | High Stone Lake | 50.400 | 91.450 | 1300 | 11 | 4 | 99.62 | 11 | 84.94 | 11 | F.H. Schweingruber |
| CANA042 | Armstrong | 50.300 | 89.050 | 1120 | 13 | 4 | 126.49 | 13 | 82.26 | 12 | F.H. Schweingruber |
| CANA043 | Armstrong, eben | 50.300 | 89.050 | 1120 | 13 | 4 | 76.38 | 13 | 63.14 | 10 | F.H. Schweingruber |
| CANA205 | Otter Rapids | 55.633 | 104.733 | 360 | 21 | 3 | 192.95 | 21 | 234.99 | 21 | A. Beriault, D. Sauchyn, J. Stroich  |
| CANA206 | Patterson Peninsula | 55.217 | 104.533 | 370 | 24 | 3 | 128.25 | 24 | 100.87 | 22 | A. Beriault, D. Sauchyn, J. Stroich  |
| CANA038 | Bruno Lake | 51.620 | 95.830 | 1000 | 23 | 3 | 134.38 | 23 | 114.22 | 23 | F.H. Schweingruber |
| CANA202 | Kinapik Island | 55.700 | 106.433 | 390 | 28 | 2 | 145.24 | 28 | 114.97 | 28 | A. Beriault, D. Sauchyn, J. Stroich  |
| CANA145 | Boreas SSA, Site 1 | 53.950 | 105.150 | 590 | 32 | 2 | 164.92 | 32 | 106.24 | 29 | D.M. Lawrence, I.D. Campbell, T.M.L. Varem-Sanders  |
| CANA282 | Boreas SSA, Site 3  | 53.950 | 105.150 | 575 | 17 | 2 | 121.28 | 17 | 81.92 | 17 | D.M. Lawrence, I.D. Campbell, T.M.L. Varem-Sanders  |
| CANA348 | Swan Hills | 54.750 | 115.617 | NA | 5 | 1 | 104.93 | 5 | 130.28 | 5 | D. Sauchyn |
|  |  |  |  |  |  |  |  |  |  |  |  |
| **Data Set** | **Site Name** | **Lat ºN** | **Long ºW** | **Elev (m)** | **No. Sam-ples** | **Distx110 km\*** | **ARW Juv** | **N Juv** | **ARW Mat** | **N Mat** | **Authors** |
| ***Larix laricina*** |  |  |  |  |  |  |  |  |  |  |
| CANA002 | Ft Chimo | 58.367 | 68.383 | 150 | 6 | 13 | 59.43 | 6 | 35.81 | 6 | H. Fritts, J. Terasmae |
| CANA271 | White Spruce Upland | 58.370 | 93.800 | 50 | 11 | 12 | 78.52 | 11 | 66.17 | 8 | S.D. Mamet, G.P. Kershaw  |
| CANA273 | Black Spruce Wetland | 58.617 | 93.833 | 16 | 31 | 12 | 31.12 | 31 | 30.87 | 23 | S.D. Mamet, G.P. Kershaw  |
| CANA069 | Churchill | 58.670 | 93.480 | 50 | 10 | 11 | 78.34 | 10 | 47.58 | 10 | F.H. Schweingruber |
| CANA276 | N Forest, Wapusk | 58.533 | 93.467 | 17 | 41 | 11 | 43.77 | 41 | 36.65 | 37 | S.D. Mamet, G.P. Kershaw  |
| CANA281 | Tundra, Wapusk | 57.950 | 93.217 | 27 | 4 | 10 | 80.14 | 4 | 85.45 | 2 | S.D. Mamet, G.P. Kershaw  |
| CANA221 | Boundary Bog  | 53.950 | 106.330 | 611 | 17 | 2 | 73.42 | 17 | 52.79 | 11 | G. MacDonald, R. Case |
| ***Picea mariana*** |  |  |  |  |  |  |  |  |  |  |
| CANA071 | Coats River - dry | 55.730 | 76.150 | 1000 | 15 | 12 | 41.21 | 15 | 29.21 | 15 | F.H. Schweingruber |
| CANA067 | No Name Lake -dry | 54.580 | 77.570 | 450 | 12 | 11 | 49.08 | 12 | 40.11 | 12 | F.H. Schweingruber |
| CANA280 | S Forest, Wapusk | 57.320 | 93.030 | 56 | 15 | 10 | 42.22 | 15 | 29.51 | 15 | S.D. Mamet, GP Kershaw  |
| CANA275 | N Forest, Wapusk | 58.530 | 93.470 | 17 | 17 | 9 | 29.90 | 17 | 34.47 | 17 | S.D. Mamet, GP Kershaw  |
| CANA081 | Yasinki - moist | 53.230 | 77.670 | 450 | 13 | 9 | 116.08 | 13 | 48.36 | 13 | F.H. Schweingruber |
| CANA080 | Yasinki - dry | 53.230 | 77.670 | 450 | 11 | 9 | 139.97 | 11 | 58.54 | 11 | F.H. Schweingruber |
| CANA076 | Eastmain - dry | 52.030 | 77.850 | 450 | 13 | 8 | 35.28 | 13 | 40.84 | 13 | F.H. Schweingruber |
| CANA055 | Capotigamon - moist | 50.170 | 68.170 | 1000 | 13 | 6 | 62.90 | 13 | 64.78 | 13 | F.H. Schweingruber |
| CANA075 | Lac Chevrillon | 50.020 | 74.450 | 1200 | 12 | 6 | 79.36 | 12 | 64.60 | 12 | F.H. Schweingruber |
| CANA054 | Lac Peribonca  | 50.030 | 71.480 | 1400 | 12 | 6 | 93.64 | 12 | 94.18 | 12 | F.H. Schweingruber |
| \*Dist x 110km is distance from southern boundary of species boundary. See text for full explanation. |  |  |  |  |

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