Supplementary Text

Research methods

Radiocarbon dating details. The long-count β-decay ages for our seven decadal wood samples were obtained from the radiocarbon laboratory at the Akademie der Wissenschaften, Heidelberg, Germany. The wood samples were pretreated first in a soxhlet apparatus to remove resins, and then put through progressive acid-alkali-acid baths, with each bath followed by distilled water rinses. After final rinsing to a neutral pH, samples were dried, combusted to CO_2, and counted. The radiometric (β) samples were measured for 10 days in gas counters.

One additional small sample of crushed wood from the base of the organic layer (ETH-35171) had insufficient mass for a β-decay date, so its ^{14}C age was measured for 60 minutes in the MICADAS AMS system at the ETH Zurich laboratory, Switzerland (Ruff *et al.*, 2007). The same chemical pretreatment procedures outlined above were used for the ETH Zurich AMS determination, followed by a final bleaching to holocellulose (Hoper *et al.* 1998), which was combusted and reduced to graphite (using an iron catalyst).

References:

Hoper, S.T., McCormac, F.G., Hogg, A.G., Higham, T.G., Head, M.J., 1998. Evaluation of wood pretreatments on oak and cedar. Radiocarbon 40(1), 45–50.

Ruff, M., Wacker, L., Gäggeler, H.W., Suter, M., Synal, H.-A., Szidat, S. 2007. A gas ion source for radiocarbon measurements at 200 kV. Radiocarbon 49, 307–314.

Supplementary Table Captions

Supplement to Table 5. List of statistics (A) between samples using CORINA software (available at http://dendro.cornell.edu/) and (B) from quality control program COFECHA v.6.06 (Holmes 1983). PFR2-2 does not correlate as well as the others due to shorter sequence and juvenile growth variability; this is also indicated by the asterisk next to the correlations of its first two segments in the COFECHA output.

References:

Holmes, R.L., 1983. Computer-assisted quality control in tree-ring dating and measurement. Tree-Ring Bulletin 43, 69-78.

Supplement to Table 6. The locations, details, and sources of the tree-ring data sets used for Table 6 are listed here. These sites contain all the available data sets for *P. glauca* for eastern North America that are available at http://www.ncdc.noaa.gov/paleo/treering.html. Many of the forest cores may not include the inner rings and pith; their average is taken from the first 100 ring-widths in the cores from each tree.

Supplemental Table 5 (Online Only)

(A) Statistics between samples:

Sample	Begins (RY)	Ends (RY)	Number of rings	Average Student's *t*	Average correlation coefficient	Average trend coefficient
PFR1-1&2&3	1001	1200	200	4.32	0.40	67.3
PFR2-2	1111	1200	90	3.26	0.33	62.1
PFR2-3	1096	1200	105	4.88	0.43	68.1
PFR2-5	1099	1200	102	4.60	0.42	63.6
PFR2-8	1093	1200	108	4.89	0.43	70.3

(B) From COFECHA, correlations between the sample and the average of all others in the indicated time segments:

	Time span of segments			
Sample	1092-1141	1117-1166	1042-1191	1167-1216
PFR1-1&2&3	0.57	0.58	0.47	0.46
PFR2-2	0.25*	0.34*	0.63	0.60
PFR2-3	0.64	0.61	0.58	0.62
PFR2-5	0.54	0.53	0.62	0.53
PFR2-8	0.68	0.77	0.69	0.66
Average	**0.54**	**0.57**	**0.60**	**0.57**

Supplement to Table 5. List of statistics (A) between samples using CORINA software (available at http://dendro.cornell.edu/) and (B) from quality control program COFECHA v.6.06 (Holmes, 1983). PFR2-2 does not correlate as well as the others due to shorter sequence and juvenile growth variability; this is also indicated by the asterisk next to the correlations of its first two segments in the COFECHA output.

Reference:

Holmes, R.L., 1983. Computer-assisted quality control in tree-ring dating and measurement. Tree-Ring Bulletin 43:69-78.

Supplemental Table 6 (Online Only)

Picea glauca sites	Alt (m)	Lat (°N)	Long (°W)	No. of trees	100-ring avg.	100-ring standard deviation	Authors
Modern coastal sites:							
Eyeglass Lake	100	57.92	61.60	10	0.58	0.174	B. Buckley, R.D. D'Arrigo
Nutak	25	57.50	61.75	6	0.50	N<10	R.D. D'Arrigo, B. Buckley, G.C. Jacoby
Medusa Bay	25	56.92	61.50	20	0.60	0.043	B. Buckley, R.D. D'Arrigo
Nain	46	56.55	62.00	13	0.67	0.064	M.H. Ames
Modern continental sites:							
Border Beacon	457	55.33	63.25	16	0.55	0.050	H.E. Wright, H. Lamb
Wakuach Lake	366	55.28	67.28	12	0.89	0.117	F.H. Schweingruber
Mountain Lake (UFE)	457	53.48	58.67	12	0.60	0.058	F.H. Schweingruber
Mountain Lake (PLA)	457	53.48	58.67	11	0.81	0.084	F.H. Schweingruber
Capotigaman	305	50.17	68.17	13	1.13	0.135	F.H. Schweingruber
Late glacial sites:							
Moffett site	576	42.67	78.32	13	0.65	0.240	C.B. Griggs
Mercy Hospital	5	43.65	70.28	5	0.67	N<10	C.B. Griggs
Pump House site	47	42.78	42.71	5	0.80	N<10	N. Miller, C.B. Griggs

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