Supplemental material
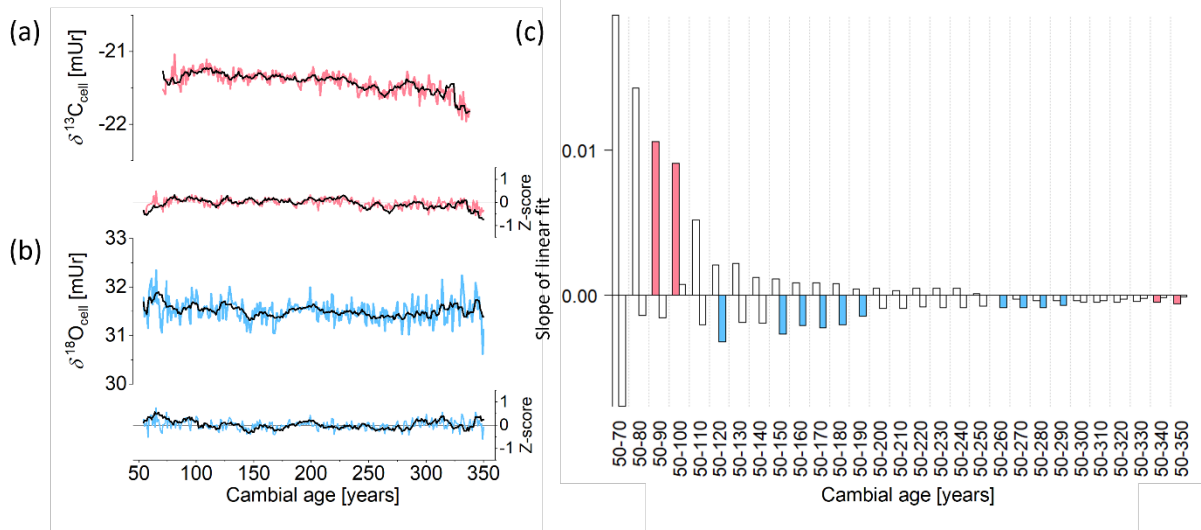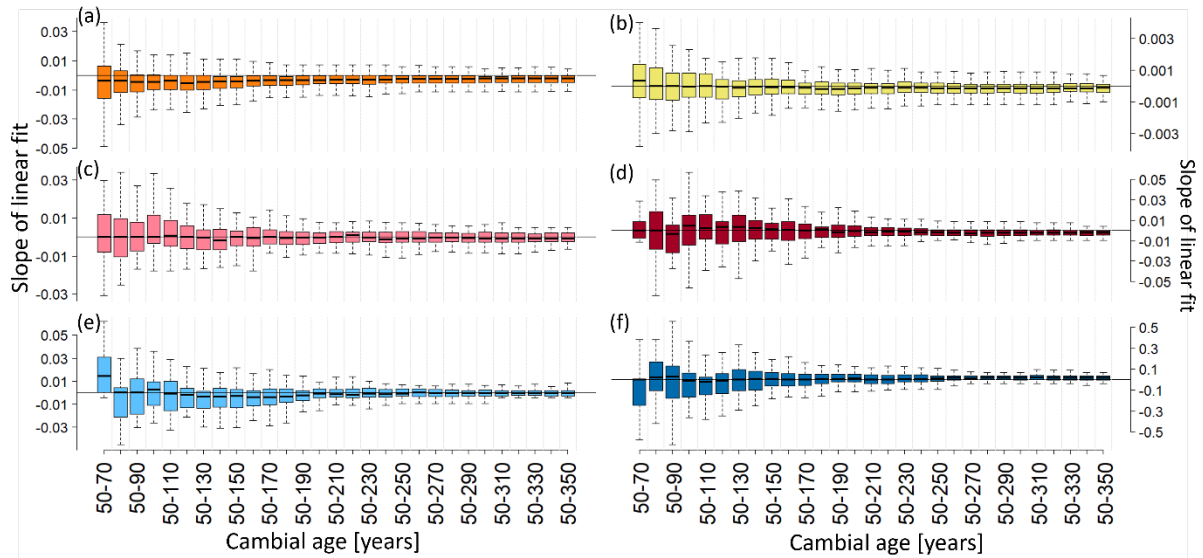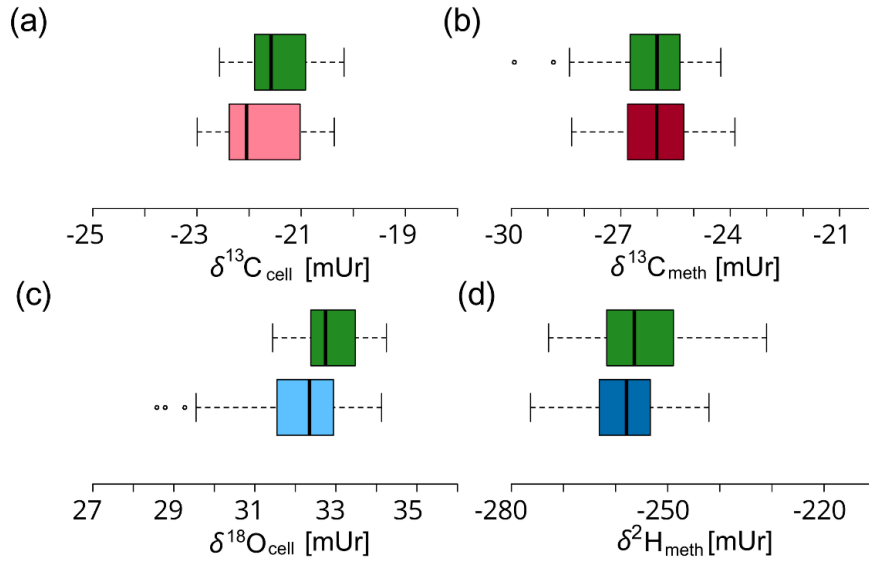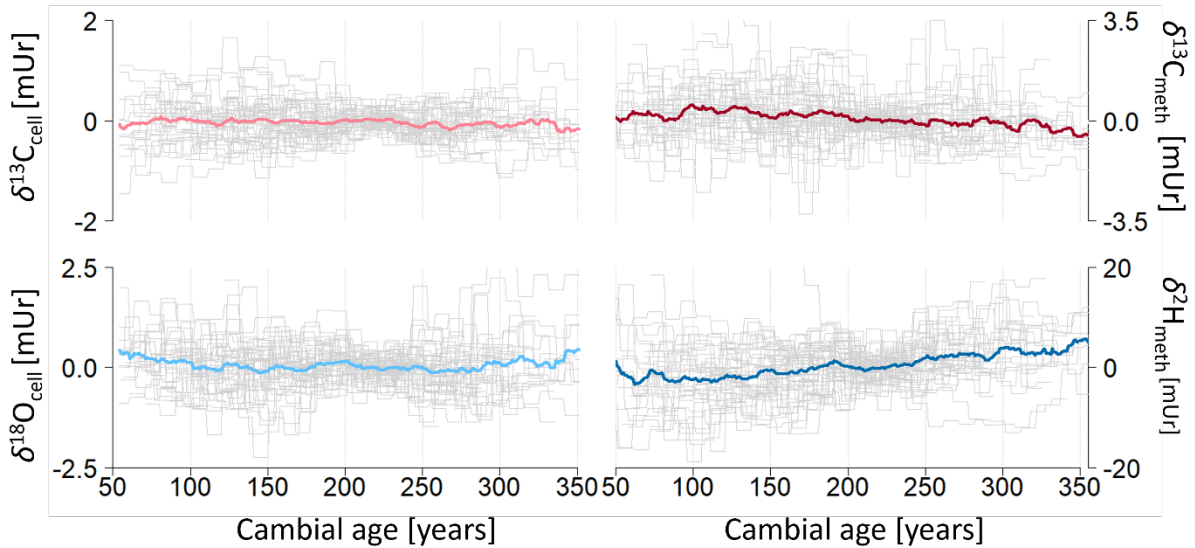

S1. Mean age-aligned (a) $\delta^{13}C_{cell}$ and (b) $\delta^{18}O_{cell}$ chronologies of the decadal (black line) and annual (colored lines) relict wood series. (c) Linear slopes of the mean z-transformed $\delta^{13}C_{cell}$ and $\delta^{18}O_{cell}$ series at annual resolution. White bars represent non-significant ($p > 0.01$) and coloured bars significant slopes at $p < 0.01$.

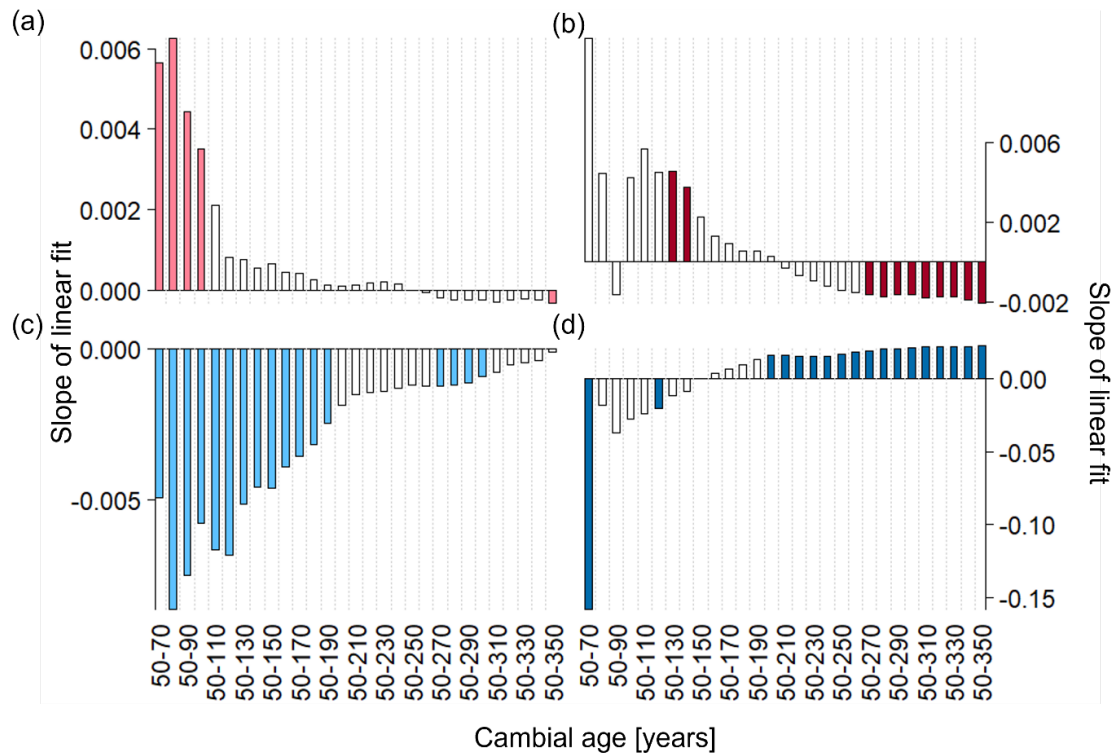S2. Linear slopes (unit per decade) of the raw, cambial-age aligned (a) TRW, (b) MXD, (c) $\delta^{13}C_{cell}$, (d) $\delta^{13}C_{meth}$, (e) $\delta^{18}O_{cell}$, and (f) δ^2H_{meth} series. Horizontal black lines represent the median (50th percentile), boxes represent the 25th and 75th percentiles and whiskers represent the 95% confidence interval.
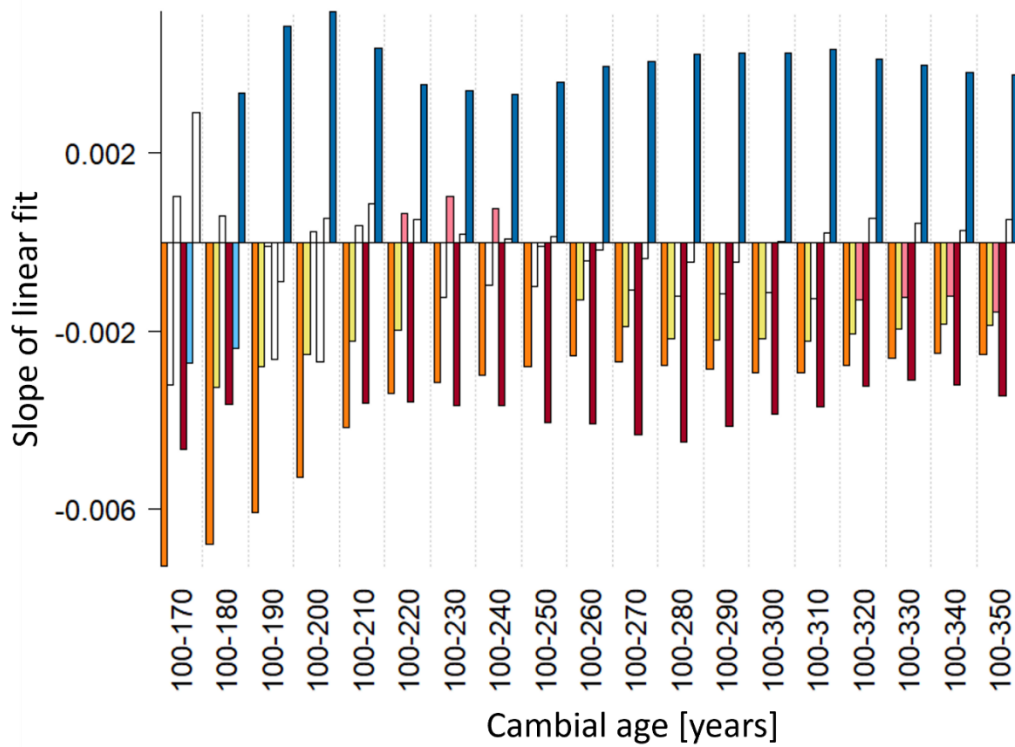
S3. Distribution and range of (a) $\delta^{13}C_{cell}$, (b) $\delta^{13}C_{meth}$, (c) $\delta^{18}O_{cell}$, and (c) δ^2H_{meth} values over the common period of living and relict wood (1641-1820 CE). Green boxes correspond to the living trees, while other colours represent the proxy-specific relict wood. Vertical black lines represent the median (50th percentile), boxes represent the 25th and 75th percentiles, whiskers represent the 95% confidence interval, and points denote outliers.

S4. Relative cambial age aligned $\delta^{13}C_{cell}$, $\delta^{13}C_{meth}$, $\delta^{18}O_{cell}$, and δ^2H_{meth} relict wood series. Relative TRSI values of individual series were calculated by subtracting the mean of the common period 202 - 238 years. Colored lines represent the arithmetic mean of the relative series.

S5. Linear slopes (unit per decade) of mean relative (a) $\delta^{13}C_{cell}$, (b) $\delta^{13}C_{meth}$, (c) $\delta^{18}O_{cell}$, and (d) $\delta^{2}H_{meth}$ series. White bars represent non-significant slopes ($p > 0.01$) and colored bars represent significant slopes at $p < 0.01$.

S6. Linear slopes of the mean z-transformed TRW (orange), MXD (yellow), $\delta^{13}C_{cell}$ (light red), $\delta^{13}C_{meth}$ (dark red), $\delta^{18}O_{cell}$ (light blue), and $\delta^{2}H_{meth}$ (dark blue) series. White bars represent non-significant ($p > 0.01$) and coloured bars significant slopes at $p < 0.01$.

S7. Example of a relict wood fragment where a disc sample was taken from unknown tree height.