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High-resolution ^{14}C measurements of tree-rings around 7400 cal BP to investigate discrepancies in the data underlying the calibration curve and to examine the potential occurrence of short-term ^{14}C events

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The atmospheric ^{14}C concentration varies through time due to the modulation of cosmic rays by the heliomagnetic and geomagnetic fields. However, the calculation of a conventional ^{14}C age assumes that the ^{14}C concentration remains constant and, subsequently, a conventional ^{14}C age must be corrected to obtain a true calendar age. This correction is performed using a ^{14}C calibration curve. The most recent calibration curve (IntCal13, Reimer et al. 2013) uses ^{14}C measurements of dendrochronologically-dated trees extending back to about 12.6 cal kBP.

In some sections of the IntCal13 calibration curve discrepancies exist between the raw data sets used in its construction. The Seattle (QL) and Belfast (UB) data sets diverge at approximately 7490 cal BP and remain offset until approximately 7220 cal BP. We investigate the differing structures of these two data sets for this period by way of high-resolution ^{14}C measurements of tree rings from the German Oak Chronology (Friedrich et al., 2004).

Furthermore, within this period the atmospheric ^{14}C concentration inferred from IntCal13 shows a peak in rate of change that is greater in magnitude than those of the periods spanning the rapid ^{14}C events reported by Miyake et al. (2012, 2013). Based on the new high-resolution data we will discuss the possibility of additional exceptional cosmic ray events during this period.

References

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