



High-precision ^{14}C and $^{40}\text{Ar}/^{39}\text{Ar}$ dating of the Campanian Ignimbrite (Y-5) reconciles the time-scales of climatic-cultural processes at 40 ka

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The Campanian Ignimbrite (CI) super-eruption (~ 40 ka, Southern Italy) is the largest known volcanic event of Mediterranean area. The CI tephra is widely dispersed through western Eurasia and occurs in close stratigraphic association with significant Late Pleistocene paleoclimatic and Paleolithic cultural events. This makes the CI tephra one of the most important tool for investigating several scientific issues ranging from volcanology, paleoclimatology to archaeology. Yet despite concerted attempts, the absolute age of the CI eruption is not well constrained.

Here we present the first direct radiocarbon age for the CI obtained using accepted modern practices, from multiple ^{14}C analyses of an exceptional large charred tree branch embedded in the lithified Yellow Tuff facies of the CI pyroclastic flow deposits, as well as new high-precision $^{40}\text{Ar}/^{39}\text{Ar}$ dating for the CI. These data substantially improve upon previous age determinations and permit fuller exploitation of the chronological potential of the CI tephra marker. Specifically, the results of our study are twofold: they provide (i) a robust pair of ^{14}C and $^{40}\text{Ar}/^{39}\text{Ar}$ ages for refining both the radiocarbon calibration curve and the Late Pleistocene time-scale in the narrow, but significant time-span across CI event and (ii) compelling chronological evidence for the significance of the combined influence of the CI eruption and Heinrich Event 4 on European climate and potentially evolutionary processes of the Early Upper Palaeolithic.