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Radiocarbon calibration uncertainties during the last deglaciation: Insights from new floating tree-ring chronologies

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Radiocarbon dating is the most commonly used chronological tool in archaeological and environmental sciences dealing with the past 50,000 years, making the radiocarbon calibration curve one of the most important records in paleosciences. For the past 12,560 years, the radiocarbon calibration curve is constrained by high quality tree-ring data. Prior to this, however, its uncertainties increase rapidly due to the absence of suitable tree-ring 14C data. Here, we present high-resolution 14C measurements from 3 new floating tree-ring chronologies from the last deglaciation. By using combined information from the current radiocarbon calibration curve and ice core 10Be records, we are able to absolutely date these chronologies at high confidence. We show that our data imply large 14C-age variations during the Bølling chronozone (Greenland Interstadial GI-1e) – a period that is currently characterized by a long 14C-age plateau in the most recent IntCal13 calibration record. We demonstrate that this lack of structure in IntCal13 may currently lead to erroneous calibrated ages by up to 500 years.