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Decadally resolved Lateglacial radiocarbon evidence from New Zealand kauri

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The Last Glacial-Interglacial Transition (LGIT; 15,000 - 11,000 cal BP) was characterised by complex spatiotemporal patterns of climate change, with numerous studies requiring accurate chronological control to decipher leads from lags in global palaeoclimatic, -environmental and archaeological records. However, close scrutiny of the few available tree-ring chronologies and radiocarbon-dated sequences composing the IntCal13 radiocarbon (14C) calibration curve, indicates significant weakness in 14C calibration across key periods of the LGIT. Here, we present a decadally-resolved atmospheric 14C record derived from New Zealand kauri spanning Greenland Stadial 1 (GS-1; ∼12,900 – 11,650 cal BP). Two floating kauri 14C time series, curve-matched to IntCal13, serve as a radiocarbon backbone through GS-1. Floating Northern Hemisphere (NH) 14C datasets are matched against the new kauri data, forming a robust NH 14C time series to ∼14,200 cal BP. Our results show that IntCal13 is questionable from ∼12,200 - 11,900 cal BP and the ∼10,400 BP 14C plateau is approximately five decades too short. By precisely aligning Southern and Northern Hemisphere tree-ring 14C records with marine 14C sequences, we document two relatively short periods of North Atlantic Meridional Overturning Circulation (AMOC) collapse during GS-1. Hence, sustained North Atlantic cooling across GS-1 was not driven by a prolonged AMOC reduction but was probably due to an equatorward migration of the Polar Front.