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A natural cause for diverse CO2 trends during different interglacials

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The rapid rise in CO2 concentration of the last two centuries is unequivocally anthropogenic. Prior to that, CO2 concentrations also increased slowly for the previous ∼7 ka. Several explanations have been advanced for this increase, some calling on natural processes, others demanding an early anthropogenic influence. The critical question that has been raised though is not why there was a Holocene increase, but why a similar increase was not seen in the three previous interglacials and only in a subdued way in Marine Isotope Stage (MIS) 11. Here we show that the Holocene is also distinct from the last 3 interglacials in having a low value for CO2 concentration at the end of the transitional rise, preceded by a termination punctuated by an exceptional northern hemisphere abrupt warming (the Bolling-Allerod). These two facts point to the importance of the relative phasing of vegetation regrowth leading to CO2 uptake, and the offsetting emission of CO2 due to carbonate compensation (and perhaps also reef building) within each termination and interglacial. We show that the inferred different histories of these processes leads in a consistent way to both the different starting values and trends amongst interglacials. An early anthropogenic influence is not required to explain the distinct Holocene pattern.