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Impacts of post-photosynthetic fractionation on the carbon isotopic composition of leaf wax *n*-alkanes under elevated CO_2

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The carbon isotopic composition of plant wax *n*-alkanes ($\delta^{13}C_{n\text{-alkane}}$) is a well-established proxy for bulk plant $\delta^{13}C$, which itself reflects plant community composition and palaeohydrology in the geologic record. Although the biosynthetic processes which form *n*-alkanes cause a depletion in ^{13}C relative to bulk plant tissue, it is generally presumed that this depletion is constant. In particular, on geologic timescales bulk plant $\delta^{13}C$ is invariant to changes in atmospheric CO_2, and it is therefore assumed that $\delta^{13}C_{n\text{-alkane}}$ follows the same pattern. However, this assumption has not been tested, and it is possible that the biosynthetic fractionation during the formation of *n*-alkanes and other lipid biomarkers is affected by atmospheric CO_2 concentration independently of trends in bulk plant tissue. Here, I use the Birmingham Institute of Forest Research (BIFoR)'s Free Air Carbon Enrichment experiment (FACE) to investigate the impact of elevated CO_2 on both bulk and *n*-alkane $\delta^{13}C$ in order to identify any such influence of elevated CO_2 on *n*-alkane isotopic composition. If any such effects are detected, CO_2 levels should be accounted for in interpretations of deep-time $\delta^{13}C_{n\text{-alkane}}$ records.