



Turnover of new soil carbon inputs under increased atmospheric CO₂: synthesizing the isotopic evidence

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Rising levels of atmospheric CO₂ often stimulate plant inputs to soil, but the effect of these changes on soil carbon (C) dynamics are poorly understood. Plant-derived inputs can accumulate in the soil and become part of the soil C pool ("new soil C"), or accelerate losses of pre-existing ("old") soil C. The dynamics of the new vs. old pools will likely differ and alter the long-term fate of soil C, but these separate pools, which can be distinguished through isotopic labeling, have not been considered in past syntheses. Using meta-analysis, we found that while elevated CO₂ stimulates the accumulation of new soil C in the short term (< 1 year), these effects do not persist in the long term (> 1 year). Our results are inconsistent with predictions of conventional soil C models and suggest an increase in turnover rates of new soil C under elevated CO₂.