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Notes S1 Analysis of modelled land C sink trends

We evaluated the time series of the simulated and observations-based land C balance, its decadal mean for years 2011-2020 and long-term trend for years 1959-2020 from outputs of the Trends and Drivers of Terrestrial Sources and Sinks of Carbon Dioxide (TRENDY) version 8 model intercomparison (Sitch et al., 2024). We downloaded the original file `Global_Carbon_Budget_2021v1.0.xlsx` (`doi:10.18160/gcp-2021`) from the Global Carbon Budget 2021 website and exported the tabs 'Terrestrial Sink' and 'Global Carbon Budget' for further analysis. From the latter, we derived the land C sink as the budget residual as quantified by (Friedlingstein et al., 2022):

$$S_{\text{Land}} = (E_{\text{FF}} + E_{\text{LUC}}) - (G_{\text{atm}} + S_{\text{ocean}} + S_{\text{cement}}) \,, \tag{1}$$

where S_{Land} is the land sink ('Observations' in Fig. 1 of the main text), E_{FF} are emission from fossil fuel combustion, E_{LUC} are emissions from land use change, G_{atm} is the atmospheric growth rate, S_{ocean} is the ocean sink, and S_{cement} is the C sink from cement carbonation. The land sink simulated by models was taken as the annual C flux numbers provided in the tab 'Terrestrial Sink' of the original file. It was taken by (Friedlingstein et al., 2022) as the global biome producitivity (net terrestrial C balance) from simulations (TRENDY S2) forced by observed CO_2 and climate and with constant pre-industrial land use. The identification of models into C-only and C-N coupled models was done based on information provided in Table A.1 in (Friedlingstein et al., 2022).

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