

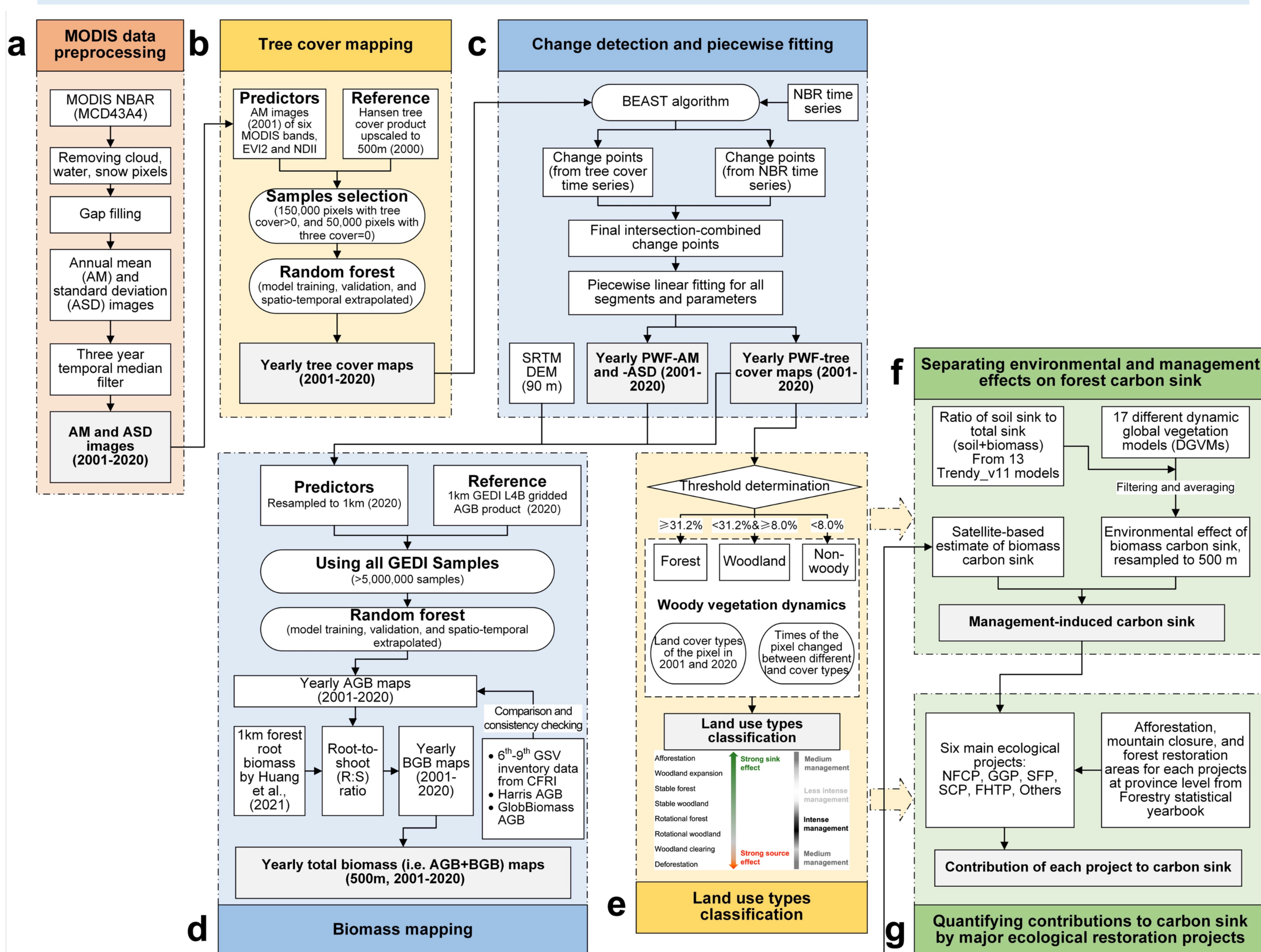
Conservation and expansion of woody areas drive growing biomass carbon stock in China

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Background

The Paris Agreement mandates signatory countries to enhance transparency in their climate actions and national greenhouse gas inventories (NGHGs). China's NGHGs reported substantial forest carbon gains based on national forest inventories (NFIs), but the relative contributions of human management versus anthropogenic environmental changes remain unclear.

Methods



Overview of woody biomass carbon sink and its drivers for 2001–2020

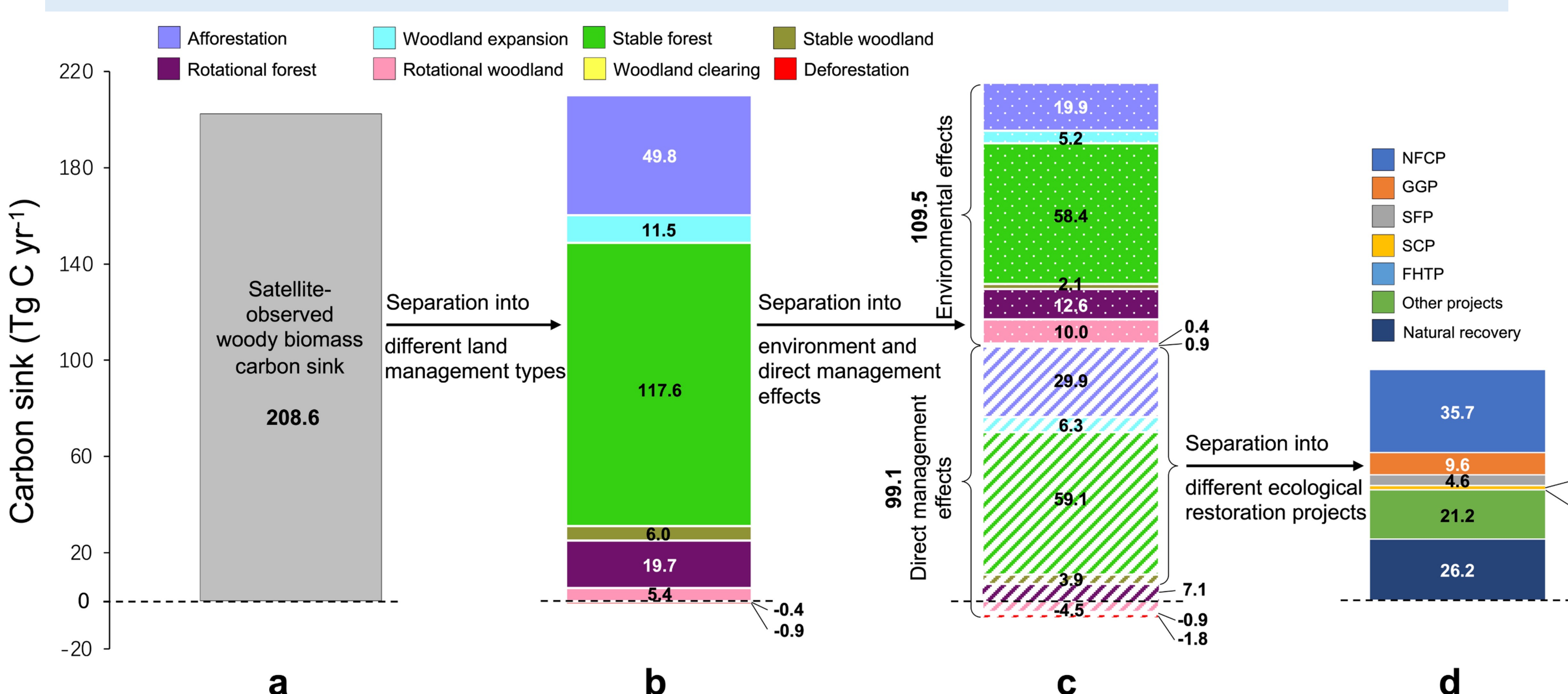


Fig. 1 Results overview: satellite-derived woody biomass carbon sink in China for 2001–2020 and its separation into different contributions.

(a) Satellite-derived woody biomass carbon sink. (b) Separating the observed carbon sink by drivers of different land management types. (c) Separating environmental and direct management contributions for each land management type. (d) Quantifying the direct management carbon-sink effects for several key national ecological restoration projects.

Satellite-based woody expansion and the associated biomass carbon sink

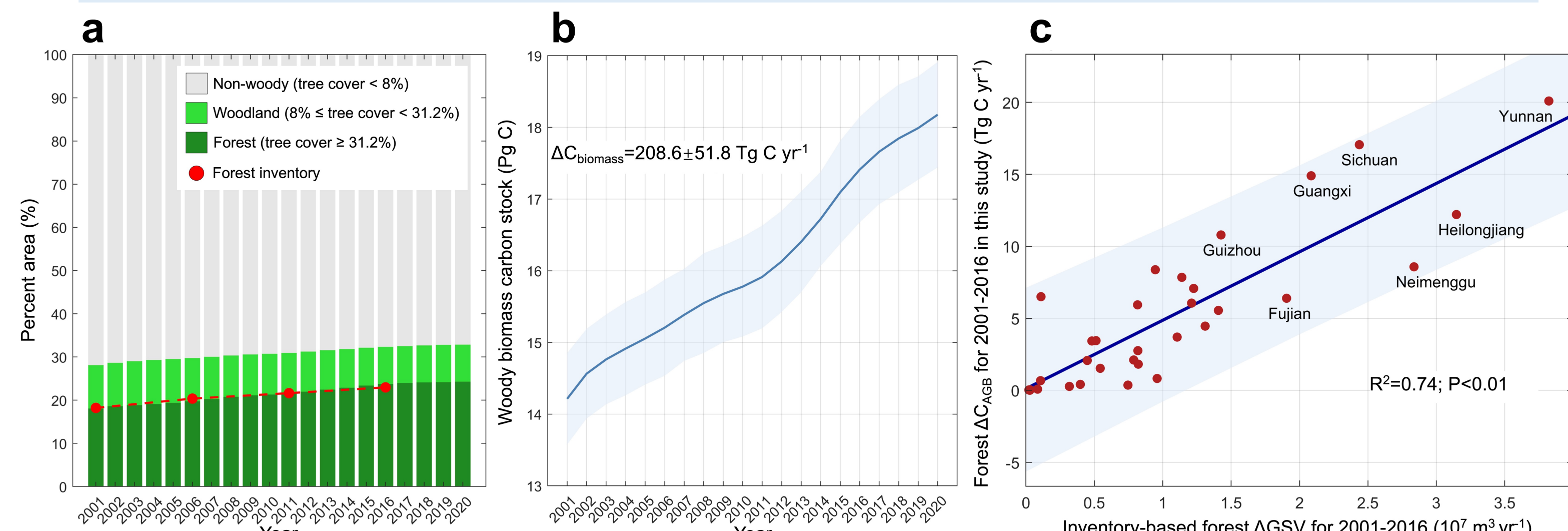


Fig. 2 Satellite-derived forest expansion and woody biomass carbon sink in China for 2001–2020. (a) Changes in the land area percentages of woody and non-woody areas. (b) Annual woody biomass carbon stocks. (c) Relationship between satellite-derived forest aboveground biomass carbon sink (ΔC_{AGB}) and inventory-based growing stock volume (GSV) change for different provinces

Contributions to the woody biomass carbon sink by different land management types

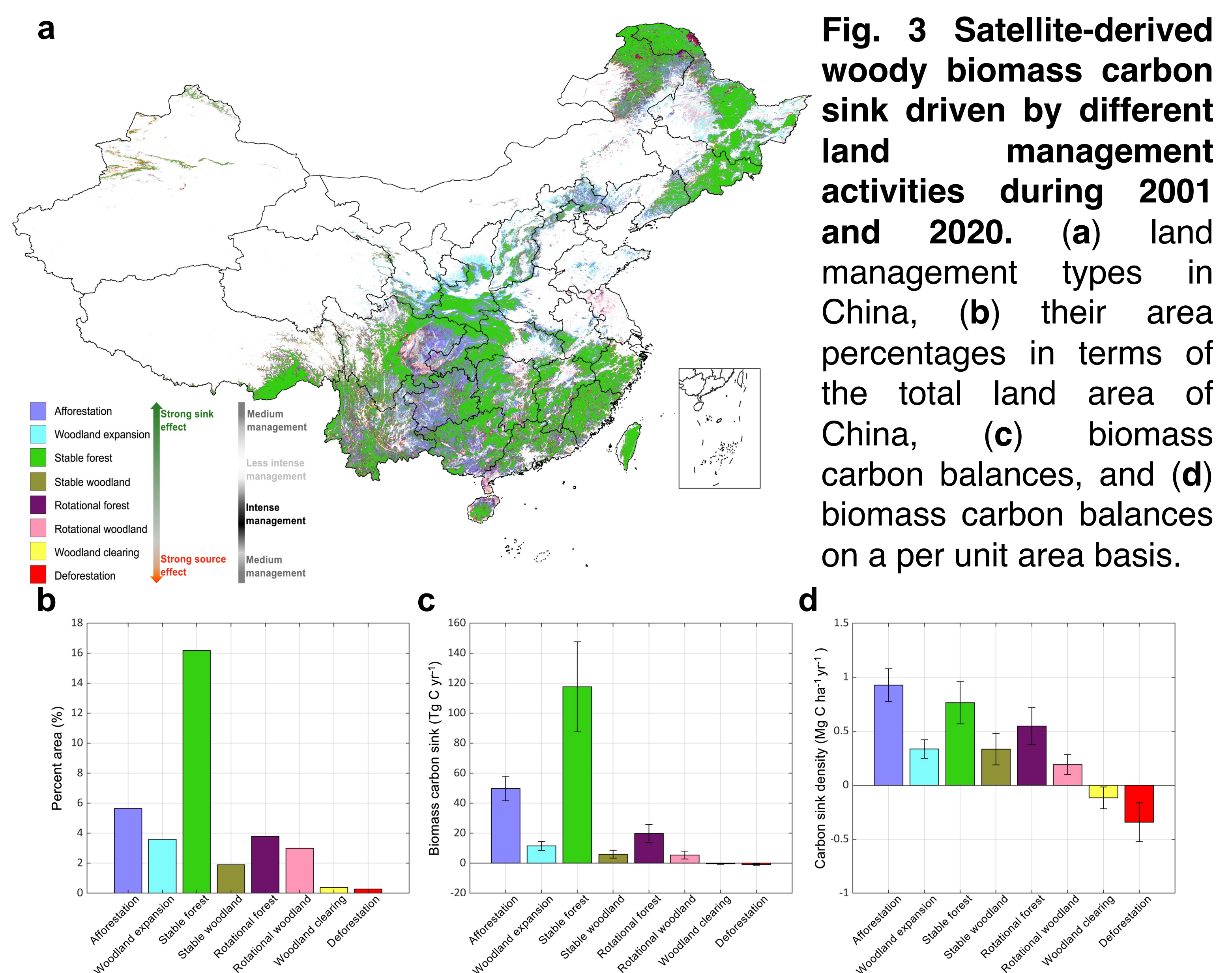


Fig. 3 Satellite-derived woody biomass carbon sink driven by different land management activities during 2001 and 2020. (a) land management types in China, (b) their area percentages in terms of the total land area of China, (c) biomass carbon balances, and (d) biomass carbon balances on a per unit area basis.

Separating the observed carbon sink into environmental and direct management effects

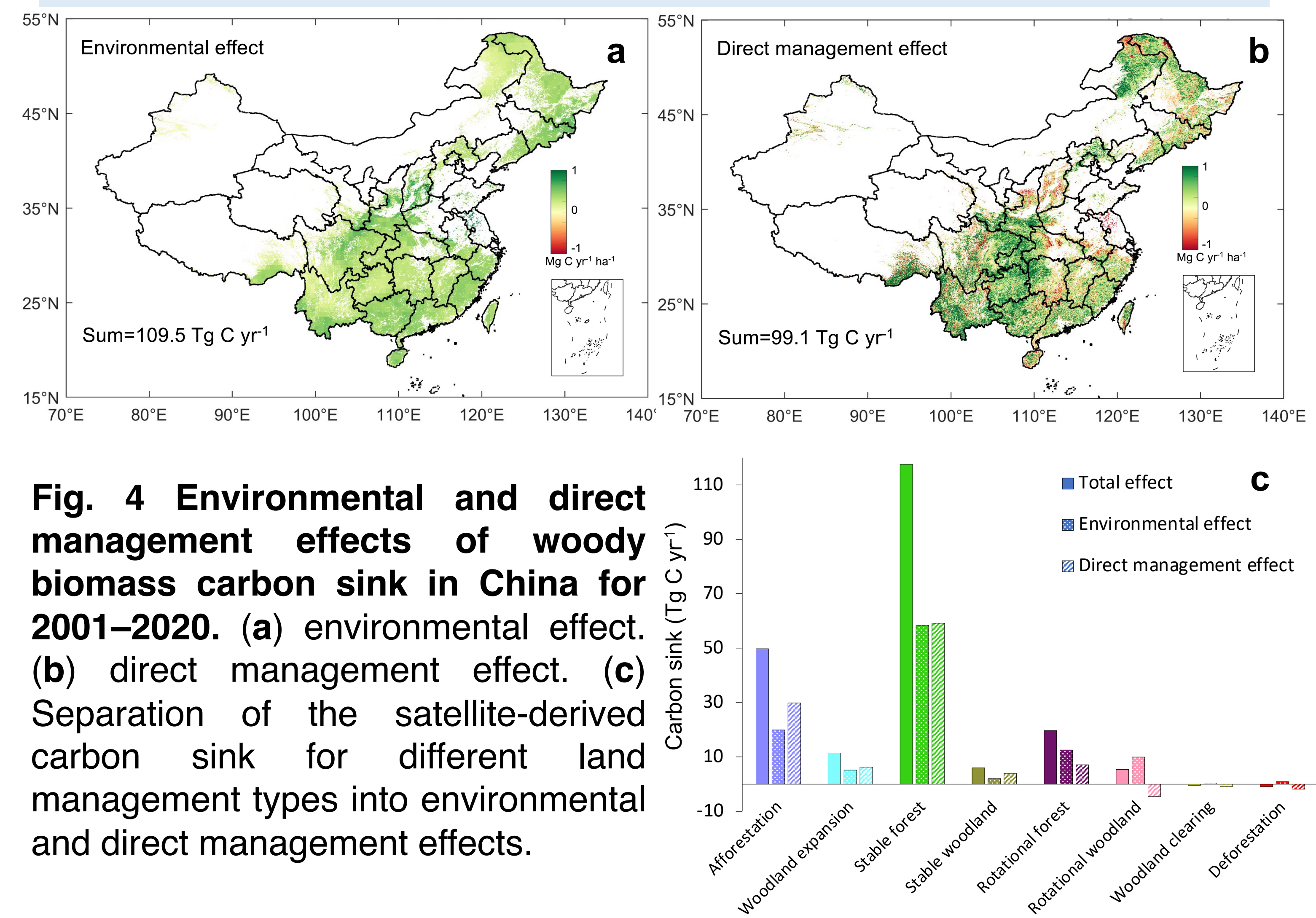


Fig. 4 Environmental and direct management effects of woody biomass carbon sink in China for 2001–2020. (a) environmental effect. (b) direct management effect. (c) Separation of the satellite-derived carbon sink for different land management types into environmental and direct management effects.

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