Do Southern Rockies conifer forests store more carbon after fires?

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❖ Background:
❖ Postfire forest recovery can take different pathways depending on the rates of vegetation mortality, recruitment and regrowth.
❖ We evaluate:
   1. How does the recovery rate vary across three ecoregions (Pacific North west, Northern Rockies, and Southern Rockies)?
   2. To what extent do climatic conditions and fire characteristics explain postfire recovery in each ecoregion?
   3. To what extent did wildfires in the western US change growing stock volume (GSV) over a 34-year record?

❖ Results:
❖ Western US ecoregions take between 9-25 years to show a gain of canopy height beyond tree mortality.
❖ High burn severity regions show the largest decline in canopy height (23% - 52.5%), while low burn severity areas show the lowest (1.3% - 6.2%).
❖ Southern Rockies gains 14% of growing stock volume (GSV) while both the Northern Rockies (-32%) and Pacific Northwest (-7%) show a loss of canopy volume.
❖ Canopy openness and internal canopy heterogeneity exceeds the unburned state in all three ecoregions.
❖ Canopy external heterogeneity is the only metric that recovers to its unburned state.

❖ Conclusions
If the fire return interval becomes shorter than 50 years, the rapid recovering forests in Southern Rockies potentially store more carbon than the pre-fire state while both Northern Rockies and Pacific Northwest regions will significantly reduce the carbon stock.

❖ Methods:
❖ Extracted Global Ecosystems Dynamic Investigation (GEDI) estimated vegetation height and cover metrics from all burn severity categories and from unburned background forests from each fire.
❖ Calculated percent change of canopy height.
❖ Calculated growing stock volume (GSV) using canopy height and cover estimates.
❖ Fitted non-linear models to build postfire recovery trajectory for three chronosequence, PNW, NR, and SR using percent canopy height change and the time since fire.

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