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Likely future(s) of global wildfires

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We show likely substantial increases in burning by 2100 in Boreal and Tropical Forests irrespective of future emissions and after accounting for the (often considerable) uncertainties and biases in global fire and climate modelling. Rather than projecting future fire regimes directly, we used the ConFire Bayesian framework to model the likelihood of all possible future burning levels given historic fire and climate model performance. Driving the framework with bias-corrected outputs from four ISIMIP2b GCMs run under RCP2.6 and RCP6.0 accounts for uncertainties in future emissions and climate model projections.

While we forecast the potential for substantial shifts in fire regimes of much of the world by the end of the century, many show low likelihood given our confidence in the fire, vegetation and climate model projections. Tropical savannas show the largest potential for change, though without confidence in the direction of change due to uncertainty in future precipitation projections. An increase in dry fuel drives an increase in burnt area in northern Australia. However, this is not significant against uncertainty associated with present-day veg/fire model performance. There is a significant agreement for decreased burning in Southern Brazil, Uruguay and northern Argentina, and the US east coast under RCP2.6, but not RCP6.0.

We do show a high likelihood of drying fuel loads driving an increase in burning in Indonesia, Southern Amazon, central and eastern Siberian Taiga and many Arctic areas across RCPs. These areas are of particular concern given the potential to release the high carbon content of forests and peatlands irrecoverable carbon. Mitigating from RCP6.0 to 2.6 will likely alleviate some though not all of this burning. This is important for future mitigation planning and determining likely temperature and emission targets to avoid the worst impacts of fire in our warmer world.