

Assessment of Prescribed Burning and Their Impact on Wildfires and Air Quality Across the US as Observed With Multi-Years Satellite Observations

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Abstract

Fire events become more intense and severe, affecting the population near the burned areas and downwind of the smoke plumes. One management tool employed to reduce the frequency and intensity of wildfire damages is the use of prescribed fires. Most studies analyzing the impact of prescribed fires on wildfire focus either on specific regions of the US or only look at a short period. More importantly, it is often assumed that prescribed fires reduce wildfire hazard. Landsat satellite measurements have been providing burned area information since 1984. The interagency program Monitoring Trends in Burn Severity (MTBS) not only provides the extend of fires obtained from Landsat measurements but also the type (wild or prescribed) of fires. However, an important aspect yet to be explored is the relationship between prescribed fires and their impact on wildfires across the contiguous United States (CONUS) over the past 40 years. Carbon monoxide (CO) is a good tracer for fire plumes and so for observing significant impacts on both local and down-wind air pollution. Using fine resolution CO measurements from the TROPOspheric Monitoring Instrument (TROPOMI) onboard ESA's Sentinel-5p satellite during the period 2018-2021 and the 40 years of MTBS measurements, our study aims to determine optimal monthly prescribed burned area for various CONUS regions. We also aims to assess how changes in prescribed amount would impact air quality in each region relative to wildfire induced pollution. Our study suggests Eastern regions could reduce managed burning, while Western regions would benefit from an increase. While this increase will not have a significant air quality impact relative to wildfires for regions along the Pacific coast, it could potentially have a stronger impact for the Mountain region states.

Early Career Scientist

NO, I am not an early career scientist.

IGAC Activities

BBURNED: Biomass Burning Uncertainty: ReactionNs, Emissions and Dynamics, MAP-AQ: Monitoring, Analysis and Prediction of Air Quality