Impacts of Wildfire Smoke on Ozone Chemistry along The Intracontinental Transport Trajectory

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Abstract

The rapid increases in the intensity and frequency of wildfires due to climate change have intensified concerns regarding their far-reaching consequences, particularly on air quality and atmospheric chemistry. This study investigates the intricate interactions between wildfire smoke and ozone chemistry along the trajectory of intracontinental transport. Utilizing comprehensive atmospheric modeling coupled with observational data, we elucidate the complex mechanisms governing ozone production along the transport pathway of wildfire smoke, especially in the downwind urban areas of the wildfires. Our findings reveal changes in ozone chemistry induced by wildfire smoke characterized by varying levels of ozone precursors that alter ozone sensitivity and production. Through a detailed analysis of key chemical reactions and atmospheric processes, we uncover the nonlinear dynamics underlying the interplay between wildfire emissions, atmospheric composition, and meteorological conditions. Furthermore, we assess the implications of these findings for air quality management strategies and public health, emphasizing the need for targeted mitigation measures to mitigate the adverse impacts of wildfire smoke on regional and intercontinental scales. This research contributes to a deeper understanding of the multifaceted impacts of wildfires on atmospheric chemistry and underscores the importance of integrated approaches in addressing the challenges posed by wildfire-induced air pollution.

Early Career Scientist

NO, I am not an early career scientist.

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