

Evaluating Fire Emissions and Long-Range Atmospheric Composition Impacts of the Canadian Wildfires Of 2023

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Abstract

In 2023 Canada experienced its worst year for wildfires with persistent, large-scale wildfires burning across several provinces and territories between May and September. Near-real-time monitoring of the wildfire activity, based on satellite observations of active fires, showed the rapid growth in the total estimate emissions from the wildfires to far exceed the annual totals of the previous two decades. We present an analysis of the Canadian wildfires during 2023 and their impact on regional air quality and longer-range atmospheric composition. We will review the underlying climatological conditions, the estimated emissions, long-range smoke transport over the Atlantic Ocean, surface deposition rates and air quality impacts. The European Centre for Medium-Range Weather Forecasts (ECMWF) through its operation of, and contribution to, different Copernicus Services is in a unique position to provide detailed information to monitor wildfires around the world, including their evolution and potential impacts. Analyses based on observations of fire radiative power, along with analyses and forecasts of associated atmospheric pollutants, from the Copernicus Atmosphere Monitoring Service (CAMS) aid in quantifying the scale and intensity in near-real-time and the subsequent atmospheric impacts, including local air quality and long-range smoke transport. Routine evaluation and validation of CAMS products is performed against independent observations, for example, ground-based Aeronet measurements and in situ measurements of carbon monoxide by IAGOS aircraft. Surface climate anomalies from the Copernicus Climate Change Service (C3S), and hydro-meteorological information based on ECMWF forecasts, provide context to the environmental conditions required for these wildfires to persist. We will show how CAMS operational products provide a wealth of information required for monitoring wildfires, atmospheric composition and air quality and highlight how these products are evolving to improve our current knowledge and understanding of wildfires.

Early Career Scientist

NO, I am not an early career scientist.

IGAC Activities

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