

# **Feedbacks on weather via fire-generated aerosols over Greece**

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## **Abstract**

Wildfires are a major source of atmospheric aerosols and can have significant impacts on air quality and radiative forcing. In our work, we have utilised the Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) to study the impact of wildfires on aerosol pollution and associated meteorological feedbacks, focusing on the geographical area of Greece as a test case. We study the summer season of 2021, during which intense wildfire activity occurred in the country. We conducted sensitivity experiments with and without emissions from fires as well as perturbations to the initial conditions to quantify the impact of such emissions on atmospheric pollutants, aerosol optical depth (AOD), radiative forcing and key weather variables such as temperature. We demonstrate that the impact of wildfires on AOD influences the local temperature over the fire affected areas negatively. Our study identifies fire-emitted aerosols as a significant factor affecting the evolution of short-term meteorological conditions, with implications for weather prediction, and provides new insights into the mechanisms leading to such effects.

**Keywords:** Greece, WRF-Chem, Wildfires, Airpollution

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