

## Aerosols under heat waves: Interactions between pollution peaks and heat waves

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Extreme weather events, particularly heatwaves, are becoming more frequent and intense in urban environments due to climate change. Tirana, a fast-growing metropolitan area, has experienced a notable rise in heatwave frequency and air pollution episodes in recent decades. This study analyses the relationship between elevated aerosol loads and extreme heat waves, aiming to understand the mutual interactions between these two extremes in this rapidly urbanizing city.

Using a combination of numerical model data for different pollutant concentrations, satellite products, and ERA5 reanalysis dataset, here are identified several heat wave events occurring during the last decades. Results show a strong correlation between hottest events and high aerosol loads. Synoptic-scale analysis suggests an increase of air pollution under stagnant air conditions during heat waves, contribute. Furthermore, urban heat island effects amplify and intensify both heat waves and pollution extremes, particularly in the city's central area.

The results of the close relationship between these extremes, emphasize an elevated risk to public health during co-occurring heat and pollution extremes, highlighting the need for continuous and appropriate environmental monitoring and early advertising systems, underscoring the importance of the strategies to mitigate the combined impacts of climate and pollution extremes in the major urban areas.

Keywords: aerosols, air pollution, heat waves, extreme events, correlation.

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