

## Spatial and Temporal Distribution of Black Carbon in Peru from the Analysis of Biomass Burning Sources and the Use of Numerical Models

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Spatial and Temporal Distribution of Black Carbon in Peru from the Analysis of Biomass Burning Sources and the Use of Numerical Models

Aldo S. Moya-Álvarez<sup>1</sup>, René Estevan<sup>2</sup>, Daniel Martínez-Castro<sup>3</sup> & Yamina Silva<sup>4</sup>

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**Abstract**

The spatial and temporal distribution of biomass burning in Peru and neighboring countries was analyzed during the 2018–2020 period, with emphasis on 2019. To determine the glaciers most affected by BC as a consequence of vegetation burning, simulations were carried out with the WRF-CHEM model, and to diagnose the origin of BC particles received by the Huaytapallana glacier, backward trajectories were built with the HYSPLIT model. It was found that, during the studied period, the burning of biomass emitted large amounts of BC into the atmosphere, while the number of fires in Peru began its most notable increase in the month of July, with maxima between August and September. Comparisons of the number of outbreaks with the Aerosol Optical Depth (AOD) measured at the Huancayo observatory showed a significant correlation. The Ucayali region is the one that contributes the greatest number of outbreaks and the greatest emissions are produced in the south of Loreto. The WRF model showed that the concentrations in July are still low in relation to the August–October period. The mountain ranges that received the greatest impact from BC emissions were Huaytapallana, Huagoruncho, and Vilcabamba. BC transport is mainly oriented from north to south, moving the particles from the areas of greatest burning to the glaciers located in the center and south of the country. BC concentrations over the Cordillera Blanca were lower. The diagnosis of the backward trajectories corroborated the results of WRF-CHEM and showed trajectories mostly from the north.

### Autor

Aldo S. Moya-Álvarez

René Estevan

Daniel Martínez-Castro

Yamina Silva

### Enlace de descarga

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