



Contribution ID : 55

Type : **Short communications**

Black Carbon in a City of the Atacama Desert before and after the Start of the COVID-19 Lockdown: Ground Measurements and MERRA-2 Reanalysis

Wednesday, 17 December 2025 09:45 (15)

In this study, the temporal variations of black carbon (BC) were analyzed from November 2019 to September 2021, in Tacna. Measurements obtained with a photoacoustic extinctions (PAX BC) and NASA's MERRA-2 reanalysis data (MERRA-2 BC) were used. The concentrations of PAX BC (mean \pm standard deviation) were as follows: 0.70 ± 0.35 , 0.73 ± 0.46 , 0.70 ± 0.39 , and $0.85 \pm 0.46 \mu\text{g m}^{-3}$, for spring, summer, autumn, and winter, respectively; while MERRA-2 BC values were 0.12 ± 0.11 , 0.06 ± 0.02 , 0.06 ± 0.02 , and $0.11 \pm 0.06 \mu\text{g m}^{-3}$, for the same seasons. We found discrepancy between these two techniques, as the PAX BC measurements were an order of magnitude higher than the MERRA-2 BC values. In addition, MERRA-2 did not record urban pollution events and did not present the BC weekend effect. The most frequent wind direction (81%) was from the southwest and the sources of greatest contamination were located to the northeast and southeast. The Mann-Kendall test confirmed a downward trend in PAX BC one week (37%) and two weeks (30%) after the start of the COVID-19 lockdown, and no trend in MERRA-2 BC. These results suggest that MERRA-2 underestimates the BC emissions from local sources.

Primary author(s): LIÑAN ABANTO, RAFAEL NERY (UNIVERSIDAD NACIONAL JORGE BASADRE GROHMANN)

Co-author(s): Dr ARNOTT, William Patrick (University of Nevada, Reno); Dr PAREDES-MIRANDA, Guadalupe (University of Nevada, Reno); Dr RAMOS PÉREZ, Omar (Universidad Nacional Autónoma de México-UNAM); Dr SALCEDO, Dara (Universidad Nacional Autónoma de México-UNAM); Dr LIÑÁN ABANTO, Rosa María (Universidad Nacional Jorge Basadre Grohmann); Dr CARABALI SANDOVAL, Giovanni (Universidad Nacional Autónoma de México- UNAM); Dr TORRES MURO, Hugo Alfredo (Universidad Nacional Jorge Basadre Grohmann)

Presenter(s): LIÑAN ABANTO, RAFAEL NERY (UNIVERSIDAD NACIONAL JORGE BASADRE GROHMANN)

Session Classification : FISICA DEL MEDIO AMBIENTE