Understanding atmospheric aerosols-precipitation interaction: Implications for climate and health

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Abstract

In recent decades, alerts have increased regarding the consequences for human life of a significant change in climatic conditions [1]. A determining factor in the evolution of the climate system is the concentration of atmospheric aerosols [2], which can alter the radiative balance of the atmosphere and, indirectly, the formation, microphysics, and duration of clouds. Such alteration necessarily implies a change in precipitation, with dramatic consequences also on the washing out of pollutants and atmospheric particles [3].

The research carried out by our research group (Atmospheric Environment - ATMOSENV), at the University of León (Spain), focuses on the physical-chemical characterization of atmospheric aerosol and precipitation, as well as on the aerosol-precipitation interaction. With this information, we study the effect of aerosols on climate and health. In the latest projects developed by the ATMOSENV group, we have conducted sampling campaigns in urban (downtown León, with high consumption of mineral coal in domestic facilities) and semi-urban (University of León area) environments. Different equipment has been used to achieve a complete characterization of atmospheric aerosol (size distribution, chemical composition, light scattering, etc.), precipitation (chemical composition, raindrop size distribution, precipitation intensity, etc.), and dry deposition (chemical composition, deposition fluxes), as well as meteorological variables (wind speed and direction, temperature, humidity, etc.). We have focused especially on primary biological aerosols and black carbon.

The presentation will showcase the most recent results of our research, which demonstrate that understanding atmospheric aerosols provides a solid foundation for addressing current environmental and climatic challenges, as well as for informing effective management and mitigation policies.

Keywords: *black carbon, dry deposition, impacts, physical-chemical characterization, primary biological aerosols*

References

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Biography

Ana I. Calvo is an Associate Professor of the Department of Applied Chemistry and Physics at the University of León (Spain). She earned a PhD in Environmental Science from the University of León in 2009 and from January 2010 to September 2013 she benefited from a postdoctoral fellowship at the Centre of Environmental and Marine Studies in Aveiro (Portugal). Her main research area is air quality, mainly aerosols (physical-chemical properties) and aerosol-precipitation interaction. She has participated in 25 projects and has coordinated (as IP) a regional and a national project. Thus far, she has authored or coauthored 62 articles published in JCR journals, 2 book chapters and more than 150 communications to international conferences with referees.