Relationship between bioaerosol and other pollutants: Preliminary results

A.I. Calvo[1], D Baumgardner[2], C. Blanco-Alegre[1], C. Gonçalves[1], E.D. Vicente[1], D. Fernández-González[3], A. Rodríguez-Fernández[3], R. Valencia-Barrera[3], A. Vega-Maray[3], and R. Fraile[1]

[1]Department of Physics, Universidad de León, 24071 León, Spain
[2] Droplet Measurement Technologies LLC, Longmont, CO, USA
[3]Department of Biodiversity and Environmental Management, Universidad de León, León, Spain

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Presenting author email: rfral@unileon.es

Primary Biological Aerosols (PBA) are a subset of atmospheric particles, released directly from the biosphere into the atmosphere. They include living organisms (algae, archaea, bacteria), reproduction units (spores and pollen), various fragments or excretions (remains of plants, trichomes, brocosomes...) (Fröhlich-Nowoisky et al., 2016). Depending on their size they can remain in the atmosphere for very different periods of time and, depending on the weather conditions, they cross geographical barriers and can be transported over long distances.

In the atmosphere, PBA interact externally and internally with other aerosols which can influence their properties. Furthermore, during the atmospheric transport, PBA also undergo chemical and physical changes, stress and biological aging. Thus, the properties and interactions of atmospheric aerosols, including bioaerosols, are among the greatest uncertainties in the current understanding of climate change prediction (Huffman et al., 2012)

Within the broad field of aerosol, the present study focuses mainly on the interaction between PBA and the aerosol, and especially with the black carbon (BC). Both elements are an active part of atmospheric pollution that causes around two million deaths/year in the world and that exerts a marked influence on the climate.

In this line, we are trying to analyze the relationship between PBA, allergenic proteins, precipitation, atmospheric pollutants (especially BC) for the prevention of respiratory allergies. In order to do this we have performed a systematic data collection of the PBA, the BC and the environmental and meteorological parameters, following the overall scheme of the study (Fig. 1).

The equipment related to the sampling of pollen, bioaerosols and meteorological variables (WIBS, Hirst, meteorological station and disdrometer) has been installed on the campus of the University of León, at the point of measurement chosen by the Spanish Network of Aerobiology. Also, at this point the particulate sampling equipment (SMPS, PCASP, aethalometer AE33, total carbon analyzer TCA08, TECORA and CAV) is located. The time resolution of the data collection depends on the measurement equipment.

Finally, a model to quantify the scavenging of PBA by rain is been developed according to their physical-chemical properties and the rain characteristics (mainly droplet size, intensity, swept volume, ...).

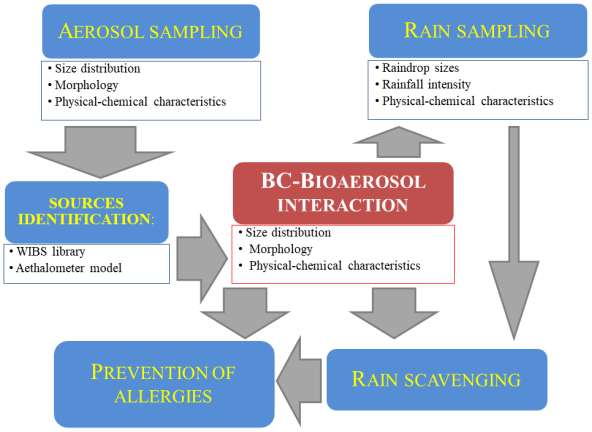

Figure 1. General framework for the study.

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