



AFRICAN DUST OUTBREAKS AND AIR QUALITY IN SOUTHERN EUROPE: IS IT ONLY DUST THAT MATTERS?

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North African dust outbreaks may have a high influence on air quality in Europe, especially around the Mediterranean Basin (MB). During specific synoptic meteorological scenarios, the normal flow of African dust towards the western Atlantic is modified in such a way that large dust streams are transported towards Southern Europe, both over the Atlantic Ocean and the Mediterranean Sea. Since June 1995 we estimate and report daily mineral African dust contributions to ambient PM₁₀ for the different air quality monitoring networks across Spain. Furthermore, we have expanded these studies to the whole MB based on PM₁₀ and PM_{2.5} 2001-2011 data collected from a number of regional background air quality monitoring sites across the MB.

We present in this talk, the method devised for quantitative determinations of daily African dust contributions, the mean annual statistics of daily dust contributions to ambient PM₁₀, PM_{2.5} (and PM₁ levels at a few sites), and their time and spatial variation across the MB. Subsequently, we highlight the importance of having information on the daily PM₁₀ and PM_{2.5} African dust net contributions as well as on the forecast of the dust outbreaks a few days before they take place. This allows us, not only to evaluate the natural and anthropogenic contributions to air quality impairment, but also to alert the most susceptible population about the occurrence of these outbreaks, and to supply data to evaluate their health effects.

We discuss the conclusions of the existing studies on health impact of dust episodes over the MB and we also suggest some possible actions to reduce resuspension of deposited African dust from urban paved roads.

Finally, we describe our recent findings showing the decrease of the atmospheric boundary layer height (BLH) during African dust outbreaks due to a reduction of the mean solar radiation reaching the surface and to the different advection of air masses. The BLH is progressively reduced with the increasing intensity of dust episodes leading to a gradual accumulation of locally generated PM₁, as well as of other atmospheric pollutants. We discuss the possible influence of this process on the studies dealing with the health outcomes related with African dust episodes.

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