



## **African dust outbreaks over the Canary Islands. Impact, dust sources areas and meteorological scenarios.**

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African air mass intrusions exert a great impact on background mineral particulate levels in the Canary Islands. Because of the proximity to the Saharan desert, the frequency of occurrence of African dust outbreaks on the archipelago is high and these episodes are occasionally very intense. Socioeconomic impacts of these episodes, due to their effects in human health, agriculture, livestock, reduction of visibility and meteorology, are important. Also, African dust episodes exert impact on the climate and oceanic biochemical cycles.

The seasonal TSP (Total Suspended Matter) variability was studied. TSP was sampled at the El Río (ER) station, sited on Tenerife (28°08'35" N, 16°39'20" W, 500 m.a.s.l.). This is a representative site to quantitatively evaluate the influence of African dust events on the background levels of suspended particulate matter in the Marine Boundary Layer of the Canary Islands. The seasonal TSP variability shows a bimodal pattern, with a maximum in winter and a secondary maximum in summer.

Residence Time Method using 120-hours HYSPLIT 4.0 backtrajectories for 25 intrusion days and for 3 levels (200 m, 1500 m and 2400 m) in the period 1998-2003 was used to identify dust sources. We have found that African sources of air masses getting Canary Islands are located in the Sahara desert, and they are associated to topographic lows and to flanks of mountains and highlands. The Bodelé depression, which is the most important dust source region in the world, is only a minor source for dust outbreaks on Canary Islands.

Geopotential height anomalies for 256 African intrusion days at four levels (1000 hPa, 850 hPa, 700 hPa and 500 hPa) in the period 1998-2003 from the NCEP/NCAR re-analysis were retrieved. For identifying monthly geopotential height anomaly patterns at these four levels two methods have been used: K-means and Principal Components. Both methods show a good agreement.

In winter the bulk of dust transport takes place at low levels. Transport at medium and high levels take place in summer. In both cases the most common synoptic meteorological scenario is characterized by positive geopotential height anomalies over Europe and North Africa being the Canary Islands on the SW flank of this high.