# GEOCHEMISTRY AND SOURCES OF NORTH-AFRICAN DUST: RESULTS FROM THE DONAIRE AEROSOL DEPOSITION NETWORK IN SOUTH-WESTERN EUROPE

Pey Jorge* (1), Larrasoaña Juan Cruz (2), Reyes Jesús (2), Pérez Noemí (3), Cerro José Carlos (4), Castillo Sonia (5), Mata María Pilar (2), Orellana-Macías José María (2), Causapé Jesús (2), Valero-Garcés Blas L. (6), Oliva-Urcia Belén (7), Santos-González Javier (8), González-Gutiérrez Blanca (8)

(1) Aragonese Foundation for Research and Development; Pyrenean Institute of Ecology-CSIC, (2) Geological Survey of Spain, (3) Institute of Environmental Assessment and Water Research (IDÆA) Spanish National Research Council (CSIC), (4) University Balearic Islands; Regional Government Balearic Islands, (5) Andalusian Institute for Earth System Research (IISTA-CEAMA); Department Applied Physics, University of Granada, (6) Pyrenean Institute of Ecology-CSIC, (7) Autonomous University of Madrid, (8) Universidad de León

The DONAIRE network (Pey *et al.,* 2020) monitors the phenomenology of geochemical, magnetic (Larrasoaña *et al.,* 2021) and mineralogical variations of bulk atmospheric deposition in the Iberian Peninsula- Balearic Islands domain. In this work we focus on recent North African dust deposition with a double objective: 1) to characterize the main geochemical fingerprints with respect to other sources of pollution; 2) to perform a source apportionment study to identify different desert-dust source areas. We used one year of data (June 2016-July 2017) from 15 monitoring sites (regional and remote, urban, industrial, or agricultural). We focus here on the impact caused by the main 4 North African dust deposition events recorded.

Dust deposition within the DONAIRE network is controlled by a number of factors including: i) the meteorological scenario triggering dust transport, ii) the occurrence of wet deposition, and iii) the local-to-regional surrounding topography. The largest dust-deposition events have been observed nearby mountain barriers under low-pressure systems approaching the Iberian Peninsula by the Atlantic Ocean.

Dust composition during moderate and intense depositional events displays particular signatures. Fe/Ti, Na/Al, K/Al or (Ca+Mg)/Fe ratios reveal a number of patterns across the network. For example, Fe/Ti ratio varies from around 10-13 during warm-season events, increasing to 22-35 during cold season episodes, which could point to different North-African dust sources.

To complement this analysis, a source apportionment study in which input samples are only those under African dust influences have revealed up to 10 factors-sources, among which three are mineral in composition. Two of these mineral sources are directly related to North African dust, while the third one corresponds to regional dust particles. The overall contribution of such desert-dust sources may explain up to 90% of total episodic deposition during the most intense events.

Our results could be used to infer the recent North African dust deposition history. Studies on lake and peatbog sequences following a similar approach are in progress (see Valero-Garcés *et al.* in this conference) and preliminary data show they be used to trace Saharan dust during the Holocene and reconstruct its relationship with climate phases.

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[1] Larrasoña et al., (2021). Atm. Environ., https://doi.org/10.1016/j.atmosenv.2021.118568.

[2] Pey J., et al. (2020). Sci. Tot. Environ., 140745, https://doi.org/10.1016/j.scitotenv.2020.140745.