



SAHARA DUST LONG-RANGE TRANSPORT OVER SOUTHERN EUROPE: FIRST RESULTS FROM LIFE+ AIRUSE PROJECT

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Long range transport of Saharan dust is a major natural source of particulate matter (PM), especially for the countries of Southern Europe. Acknowledging that this source may affect compliance with air quality standards, the EC has provided a method for member states to subtract concentrations related to dust transport when reporting PM levels (Directive 2008/50/EC). In this framework, AIRUSE project (www.airuse.eu) aims, among others, to characterize the contribution of Saharan dust episodes to PM concentration levels for four Southern European countries, where this phenomenon is frequent and may potentially have large impact on local and regional air quality.

A year-long campaign for the collection of PM₁₀ and PM_{2.5} samples was planned during 2013, at urban background sites in Porto (Portugal), Barcelona (Spain), Florence (Italy) and Athens (Greece). PM concentrations were determined gravimetrically on a 24-hr basis (midnight - midnight). In addition, information regarding the expectancy of dust episodes was collected from HYSPLIT, DREAM8b-v2.0 and SKIRON models. PM samples were collected once every 3 days but also during days when dust episodes were expected in each city.

Potential effect from Saharan dust was identified for 14%, 10%, 25% and 23% of the measurement days in Porto, Barcelona, Florence and Athens respectively. Study of the measured PM levels revealed that the highest coarse particle concentrations were indeed related with long-range dust transport. Mean 24-hr PM₁₀ concentration was generally below the respective EC limit value of 50 µg m⁻³, except for seven days, all during a strong dust transport episode on May 2013 in Athens. Coarse particles' (PM_{2.5-10}) levels during this episode were the highest measured at all sites, with mean 24-hr values reaching up 48 µg m⁻³. Mean PM_{2.5-10} concentration during dust events was significantly higher than the respective concentration during the remaining period for all sites: 11.3 ± 4.7 µg m⁻³ versus 8.8 ± 3.4 µg m⁻³ in Porto; 11.2 ± 6.8 µg m⁻³ versus 8.3 ± 4.2 µg m⁻³ in Barcelona; 9.5 ± 4.5 µg m⁻³ versus 4.8 ± 2.8 µg m⁻³ in Florence; 17.0 ± 13.1 µg m⁻³ versus 7.5 ± 4.2 µg m⁻³ in Athens.

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