

Title: **Analysis and comparison of aerosol samples from Sierra Nevada and Granada.**

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The current report is the result of the work carried out at the laboratory of Dra. Laura Tositti, in the chemistry faculty of the University of Bologna. It consists in the analysis and comparison of atmospheric aerosol filters collected simultaneously at the two Spanish stations of Sierra Nevada and Granada, in the framework of the FRESA project. The reason why particulate matter (PM) is sampled and analyzed is to correctly determine its composition, sources and the possible effects on human health.

The peculiarity of this work is the comparison of the PM composition between Sierra Nevada (2550m a.s.l., in a purely remote location) and Granada (a typical urban environment). Although their surroundings are completely different they are barely 40km away from each other, suffering from the same regional and natural trends, allowing us to distinguish more clearly the anthropogenic influence in PM. In this work 7 months of daily samplings (May to December 2018) from both stations have been analyzed through ion chromatography. All the data obtained was subjected to subsequent inquiry, such as Spearman correlation, Cluster analysis, mass reconstruction and the understanding of its monthly variations for each of the 13 ions determined.

The ionic species identified and quantified from May to December 2018 were of the same order as those found at other similar stations located in Spain and Italy. Significant day-to-day variations in PM₁₀ concentration were observed, mainly associated with changes in the concentration of elements of crustal origin due to the importance and episodic contributions of Saharan dust outbreaks.

Several comparative graphics and regression lines were made, trying to identify the differences and common trends for both stations. For this purpose, Cluster analysis and Spearman correlations were effectuated. Also, given the proximity and importance of Saharan dust to the Granada province, a series of comparisons between the peak days of mineral dust and satellite pictures of the region were conducted, proving their correlation to the aforementioned events.

In general, for Sierra Nevada the highest PM₁₀ concentrations were those of Summer, in accordance to the Saharan dust outbreaks that elevated sites receive in such season. For Granada, although such events were also observed, they were of less importance, with a high concentration of secondary particulate matter, from the emissions of SO₂, NO_x and Volatile Organic Compounds, representing the biggest share in summer.