



Characteristics of African dust in red rains collected in Northeastern Spain from 1983 to 2002

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The delivery of African dust with wet deposition in NE Spain occurs mainly under two meteorological scenarios: (1) an Atlantic depression (AD) which usually is responsible for the entrainment of dust from the Western Sahara, and (2) a North African depression (NAD) which entrains dust from Tunisia area. Also, scenarios with high pressures over North Africa (NAH-H), which are responsible for dry intrusions over the Iberian Peninsula, can be combined with local convective orographic storms to produce red rains. In this case, the dust source region can either be from the eastern or western provenances.

We have sampled most major wet African events occurring at a rural locality in the Montseny massif (41°46'N, 2°21'E, Barcelona, Spain) from 1983 to 2002 and analysed the insoluble residue from filtration for the elemental composition (n=30), ²¹⁰Pb (n=23), and the mineralogy (n=16).

Based on back trajectories, a distinction has been made between an eastern and western flux with respect to 0° Greenwich. Principal Component and ANOVA analysis between the two provenance groups have shown striking differences between them, with eastern (Tunisian) samples being significantly richer in calcite and quartz, and consequently, in Ca, Mg and Sr compared to western samples. On the other hand, western samples had significantly higher concentrations of Al, Fe, K, V and ²¹⁰Pb than the eastern samples. This differentiation is interpreted in relation to geological source area differences and to particle selection during transport. The hypothesis that

there might be differential dissolution of carbonates as dust is scavenged by red rains depending on provenance areas has been explored and it is rejected.