QUANTIFYING DEPOSITION FLUXES IN TWO NATIONAL PARKS WITH CONTRASTING AFRICAN DUST INFLUENCE: THE NORTH AND THE SOUTH OF THE IBERIAN PENINSULA

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National Parks (PPNN) are usually areas with unique ecosystems, which are protected by regulations due to their high geological/biological richness. Sierra Nevada (SNS), in the southeast, and Ordesa and Monte Perdido (OMP), in the northeast of the Iberian Peninsula, are two of the high-altitude PPNN of the Spanish network. Due to their geographical position, these areas register different climatic contexts, with different predominance of air-masses, humid-Atlantic air-masses in OMP, and sub-tropical in SNS.

Bulk atmospheric deposition is recorded in OMP since 2017, following the methodologies defined in Pey et al. (2020), whereas dry/wet and bulk deposition samples are obtained in SNS. The aim of this study is to discern the impact of African dust in the overall deposition flux at both PPNN, considering the role of the distance to the African dust source, from November 2017 to October 2019. To this end, North African events (NAF) have been identified and their contributions have been quantified, discriminating the fluxes for the NAF events and those to other provenances (no-NAF) at both sites.

Notable differences in the deposition fluxes occur in these two PPNNs. Total deposition fluxes in OMP were significantly higher (29 and 21 g m^{-2}, in 2017-2018 and 2018-2019, respectively) than those in SNS (18 and 12 g m^{-2}). The annual differences between total fluxes maintain, however, the same relation (SNS/OMP flux = 0.6). Important differences are also detected in the insoluble/soluble fractions. At OMP, soluble aerosols are the dominant fraction, 53 and 68% of the total flux in first and second year respectively, whereas in SNS the soluble fraction account for 35 and 37%, respectively. These differences are mainly related to the number of wet-deposition events, which are relatively frequent in OMP (annual precipitation around 1200 mm) and scarce in SNS (around 500 mm). Secondly, the high number of dry periods in SNS compared to OMP enhances the magnitude of dry deposition processes. The recurrence of dry-fall in SNS increases the deposition of coarse aerosols. This affects especially mineral dust, which is the prevailing component in the insoluble fraction (Castillo et al., 2017). In the case of OMP, the occurrence of dusty conditions is considerably less frequent than in SNS, but the magnitude of dust deposition by wet events is very significant. The high number of NAF events in SNS (35 % of annual days) when compared to OMP (around 15%) and the phenomenology of dust deposition, explain the observed differences in the annual dust load: several events in SNS account for less amount of dust than the observed in OMP, which is controlled by one or two severe dust-deposition episodes.

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