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Particulate matter fluxes in throughfall and stemflow under oak and pine stands

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The atmospheric particulate deposition (APD) is one source of nutrients for forest ecosystems. Forest canopies offer large deposition surfaces that can enhance the amount of particles reaching the soil as throughfall or as stemflow. However, the influence of the forest canopy on APD is still poorly known. In this study, we aim to compare the fluxes of APD reaching the soil in an open field and below the canopy (via throughfall and stemflow) in Pinus *sylvestris* L. (Scots pine) and *Quercus pubescens* Willd. (downy oak) stands located in the Vallcebre research catchments (NE Spain, 42^o 12'N, 1^o 49'E). After every rainfall, samples of each water flux were collected and filtered (0.45 μm pore size cellulose filters) to determine the particulate matter fluxes. In addition, filters corresponding to 7 rainfall events were selected to analyse the morphometric characteristics of particulates using a confocal microscopy. The APD annual rates were: 66 kg ha^{-1} year^{-1} in the open field, 82 kg ha^{-1} year^{-1}in throughfall for both species and 2.8 and 1.2 kg ha^{-1} year^{-1}in stemflow for pines and oaks respectively. At the event scale, APD in throughfall increased with increasing rainfall volume and in stemflow with increasing funnelling ratio. The flux of particulate matter in throughfall was strongly linked with the presence or absence of foliage; being higher for oaks during the dormant season. On the other hand, rainfall intensity and the time lag between rainfalls were important factors determining the number of particles below the canopy. These results show the importance of throughfall and stemflow regarding to the transfer of particulate matter to the soil. Despite APD in stemflow per surface area was small, this flux represents a hotspot of particulate matter that reaches the base of the trunks, and is therefore of special interest to understand forest soils biogeochemical cycles.